ENVIRONMENTAL SESSION

Environmental and Socio-Economic Effects Occurring During the Decommissioning and Removal Process and Measures for Mitigating Impacts

AIR QUALITY

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AIR QUALITY AND FACILITY ABANDONMENT

Air Quality Impacts and Issues
- Decommissioning and abandonment

Possible abandonment scenarios
- Full removal, onshore disposal
- Complete (or nearly so) abandonment in place

Abandonment process overview
- Apply past experience to future projects
- Scope of project – size and equipment array
- Timing and scheduling of project
- Regulatory setting
- Minimize air quality impacts considering other issues

Conclusions and Summary

AIR QUALITY ISSUES AND IMPACTS

These are Interesting Times!

Santa Barbara, Ventura Counties – 100+ years of oil development
- 1980's – massive OCS development, planning, environmental assessment, mitigation

Challenge of past: develop and extract
Challenge of future: remove and minimize impacts, cost

POSSIBLE ABANDONMENT SCENARIOS

Many combinations, including …
- Full Onshore / Full Offshore
- Full Onshore / Partial Offshore
- Full Onshore / Non-Removal Offshore

Each has different air quality (and other) impacts

ABANDONMENT PROCESS AND EQUIPMENT

Surveying (occurs throughout project)
Vessels: Side-scan sonar, marine mammals
Topsides preparation, removal
- Cutting, welding, derrick and cargo barges
- Workboats, tugs, support vessels

Jacket preparation, cutting and removal
- Cleaning equipment, cutting, welding, diving support
- Derricks, hoisting equipment, cargo barges, workboats, tugs

Transport
- Tugs, workboats
- Derrick barge, cargo barges

ABANDONMENT EQUIPMENT

Onshore…

Processes vary according to facility
- Battles Gas Plant

Equipment required includes:
- Cranes, hoisting equipment, welding, cutting
- Haul trucks, dozers, scrapers, graders, backhoes
- Contaminated site clean-up equipment

WILD CARD – SCOPE of Project

AIR QUALITY AND RELATED ISSUES

Scope

- Deep water, massive structures
- Major equipment, major emissions anticipated
- Time required to complete abandonment (whatever project is approved)

Project Timing

- Size and weather may dictate longer schedule
- Ozone season in Santa Barbara (May – October)
- Gray Whale migration (November – June)
- Potentially two or more years needed

Staging of Project

- Scope may require "shuttling" of materials
- Staging areas (e.g., Coho Bay)
- Repetitious, high-emissions work
- Additional loading, unloading

Interagency Coordination

- Many agencies, entities involved
- Jurisdictional concerns and questions likely
  - Safety
  - Marine mammals
  - Air quality
- Minimize air quality impacts in concert with other issue areas

AIR QUALITY REGULATORY SETTING

Permits required for abandonment, removal

New Source Review triggered

Best Available Control Technology required

- Reduce project emissions
- Typical engine controls
  - Timing retard
  - Turbocharging
  - Intercooling
- Safety

Offsets – state law prohibits offsets for abandonment

State Portable Equipment Registration Program

- Applies to onshore portable equipment
- May apply offshore eventually

Chevron / APCD agreement

- Shutdown credits to offset abandonment emissions only
- Go to "Clean Air Benefit" afterward
- Credits not banked for future use

CONCLUSIONS

"Continuum" of available options

Air quality impacts are greater with…

- Longer projects
- Projects that occur in "ozone season"
- Larger equipment array
- More, and more frequent heavy lifts
- Positioning, shuttling, cycling of equipment

Air quality impacts are lessened with…

- Shorter duration projects
- Projects that effectively avoid ozone season
- Less equipment and fewer operating hours
- Fewer heavy lifts
- Less positioning, shuttling, cycling of equipment

CONCLUSION

Best air quality option

- Topsides removal
- Partial removal of jacket
- Abandon the rest in place

PLATFORM DECOMMISSIONING: COMMERCIAL AND RECREATIONAL FISHERIES EFFECTS

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Director, Joint Oil Fisheries Liaison Office

COMMERCIAL FISHERIES

- Trap for crab, lobster, shrimp
- Trawl for halibut, shrimp, cucumbers, sole, rockcod
- Drift gillnet for swordfish, shark, seabass
- Purse seine for squid, sardines
- Hook and line for rockcod
- Troll for salmon

RECREATIONAL FISHERIES

- Commercial Sportfishing Charters for kelp bass, rockcod, seabass, halibut, bonito, barracuda, salmon, shark, warmwater exotics, etc.
- Private sport fishing boat fleet, similar target species
- Commercial Diveboat Charters for lobster, spearfishing or nonconsumptive uses
- Private sport dive boat fleet, similar purposes

OPTION 1: FULL PLATFORM REMOVAL

- Areal preclusion –[1]
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

OPTION 2: NON-REMOVAL, ALTERNATE USE

- No removal operations = no effects

OPTION 3: PARTIAL JACKET REMOVAL, ARTIFICIAL REEF

- Areal preclusion –
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

OPTION 4: MOVE JACKET TO ARTIFICIAL REEF SITE

- Areal preclusion, two sites –
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

OPTION 5: DEEPWATER DISPOSAL OF JACKET

- Areal preclusion, possible two sites –
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

[1]- and + refer to the negative or positive impacts of the activity on fishers.

OPTION 6: FULL PIPELINE REMOVAL

- Areal preclusion along pipeline route –
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

OPTION 7: PARTIAL PIPELINE REMOVAL

- Areal preclusion, part of pipeline route –
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

OPTION 8: ONSHORE FACILITY REMOVAL & RESTORATION

- Not directly relevant to commercial or recreational fisheries

SUMMARY OF POTENTIAL EFFECTS

- Areal preclusion –
- Gear damage –
- Debris – or +
- Vessel traffic –
- Potential fish dispersal (noise) – or +

OIL INDUSTRY / COMMERCIAL FISHERIES PROGRAMS FOR POTENTIAL IMPACTS

- Debris: Site clearance work following all removal operations
- Gear Damage: Agreements to reimburse for damaged/lost gear
- Vessel Traffic: Oil Industry Service Vessel Traffic Corridor Program

OUTSTANDING ISSUES

- Areal preclusion during decommissioning operations
- Debris missed by site clearance procedures
- Vessel traffic to and from areas not covered by agreed-upon traffic corridors

THE COMMERCIAL FISHING INDUSTRY IN SOUTH/CENTRAL CALIFORNIA

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Director, Joint Oil Fisheries Liaison Office
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Sea Grant Extension Program

INTRODUCTION

This section describes various commercial fishing activities currently operating along the south/central coast of California. This region roughly corresponds to Region II of the federal and California state geophysical permit programs. This region also corresponds with an area of high interest to the oil and geophysical industries.

Information presented here covers fishing seasons and areas for a number of active fishery types in the area, as well as descriptions of commercial fishing techniques, gear, and vessels to be found here. In addition, key fishing industry, government, and local contact information is provided to facilitate the dissemination of the information regarding geophysical programs. These contacts can often provide further and/or more recent information on commercial fishing activities.

Commercial fishing in the south/central region of California, ranging from the port of Morro Bay in San Luis Obispo County to Port Hueneme in Ventura County, is unique in at least two ways. First, the number and types of fishing gear used and species caught is quite varied, and over 20 species are harvested commercially. Second, much of the fish caught in the Santa Barbara Channel and Santa Maria Basin fishing grounds is marketed primarily as fresh fish to markets and restaurants, rather than reduced or frozen for sales to large distribution networks. Some fisheries are dependent on highly migratory or unpredictable stocks, and therefore may change radically in size from one year to the next.

Other sources for information on current fishing activity in any given area are (in no particular order) the Unit Managers of the California Department of Fish and Game (Morro Bay and Santa Barbara Regional Units), the Santa Barbara Sea Grant Marine Advisory Office, and the Joint Oil/Fisheries Liaison Office. These offices will usually be aware of the most recent trends in fisheries activities for their respective areas.

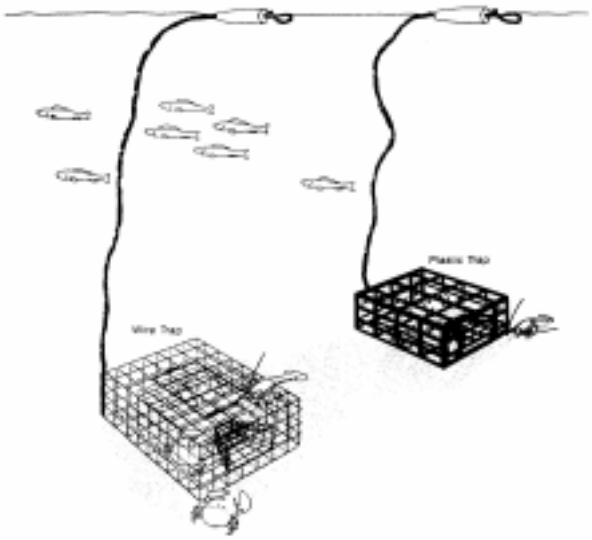
This paper presents information on fishing seasons, and then provides aid to geophysical survey vessel operators on how to recognize fishing gear types from visible signs of fishing gear on the surface of the water. Each fishery is then discussed in turn, providing a brief description of fishing techniques, gear, and vessels. All information on a particular fishery is grouped together in this way for convenient reference.

THE CRAB FISHERY

The commercial crab fishery in south/central California seeks two different groups of crabs The largest crab fishery is for what is commonly called ‘rock crab,’ a composite of three species red rock crab. yellow crab, and brown crab. The red rock crab is caught primarily around or on submerged rocky outcrop areas. The other types are caught in areas of low relief sand or sandy mud bottom. This fishery is active all year, and many of the fishermen who fish crab gear also fish lobster gear in lobster season (October-March).

Traps are basically wire, plastic coated wire. or plastic mesh boxes 2, 3, or 4 feet square which are weighted to stay in place on the seafloor (**Figure 1**). Braided polypropylene rope (usually 3/8 inch diameter) is used to deploy and retrieve traps, which are set in nearshore waters from shore to 40 or 50 fathoms deep.

Figure 1. Crab and Lobster Traps, as deployed.



Crab traps (pots) are baited and deployed in fishing grounds The pots are commonly left to fish ('soaking') for about 3 days, and are then retrieved. The crab fishing vessel pulls alongside the pot buoy(s), grapples the buoy on deck, feeds the line through a 'pinch-puller' winch of some kind, and raises the pot from the seafloor. The crabs are taken from the pot, it is rebaited, and redeployed. Normal fishing practice dictates the movements of trap locations: if the traps are fishing well, they are left where they are. If the traps are not catching much, they will usually be moved to try a new location. In practice this means that groups, or 'strings' of gear will be moving from one location to another on an unpredictable time schedule dictated by crab population movements. It is therefore difficult to predict the location of any particular string of gear at a given time. Most full-time crab fishermen have at least 50-70 pots, and many crab fishermen have upwards of several hundred pots arranged in 'strings' of from 5-25 individual traps set along particular depth contours.

The vessels used in the commercial rock crab fishery are most often smaller than their Alaskan counterparts, ranging from about 20 to 40 feet in length (**Figure 2**). Most often these smaller, faster boats are equipped with a small davit and winch, or crab pot-puller of some kind to haul in the gear from depth. Since these vessels are smaller, and since many crab fishermen have upwards of several hundred pots, this means that pots are deployed over several trips to get full operational capacity (one such vessel may only safely carry 10 to 30 pots at a time), and relocating gear must also be done in increments allowed by deck space.

Figure 2. Crab or Lobster Vessel, Fore Deck.

The second crab fishery is a southern extension of a larger, northern California to Alaska fishery for Dungeness crab. Both the trap and buoy systems are somewhat different for this fishery, and the Dungeness crab fishery is highly variable in this area, depending on signs of stock early in the season. This fishery extends from northern California south through the Santa Maria Basin to Point Arguello in some years. Dungeness crab vessels tend to be larger (25-75 feet) than those fishing rock crab south of Point Conception.

From a practical standpoint in locating and assessing the deployment pattern of a string of pots, it is important to consider the effects of tide and current strength on the line and buoy, and windage on the buoy, in determining the actual location of the gear. During conditions of high tide, strong currents or high winds, buoys may be below sea surface and therefore not visible until conditions slacken. Rough seas may also make spotting buoys more difficult.

Most of the crab, rock or Dungeness, are marketed locally (within a 300 mile radius of the Region) to fresh fish wholesalers. markets, or restaurants, and marketing crab is highly competitive. If a particular crab fisherman cannot assure his market of a steady supply, he/she is not likely to continue to be able to sell to that market, since the market can seek product from other more steady producers of crab. Minimizing interactions with crab

fishermen and their gear therefore minimizes the potential for altering an individual's position in this highly competitive market.

THE LOBSTER FISHERY

The lobster fishery is quite similar to the crab fishery. The pots used are of a similar size, with similar buoys marking their location, and are fished by similar size vessels. In fact, most crab fishermen also fish lobster, changing over some of their crab gear to lobster gear, or adding strings of lobster gear to their deployed crab gear in nearshore waters. Some fishermen target only on lobster and do not fish crab, thus adding to the total number of vessels, and pot gear, in nearshore waters during the season. One of the main differences between crab and lobster fishing is that lobster fishing is confined to a specific season; fall through winter. Opening day of lobster is the first Wednesday in October, and the season closes on the first Wednesday after the 15th of March. Another difference in lobster gear deployment patterns is that in addition to arranging pots along depth contours in 'strings,' lobster pots are also grouped in clusters which fringe rocky outcrops on the seafloor, since the lobster may sometimes be found in association with these outcrops.

Typically at the beginning of the season there is a certain amount of 'jockeying' for desirable positions along the coastline among lobster fishermen, as they establish their positions relative to one another along the coast and at the Channel Islands early in the season. The Department of Fish & Game allows fishermen to set out their gear a few days before the season actually starts, provided they are unbaited, with the doors open. It is therefore most usual to see a rapid buildup of large numbers of lobster pots in nearshore areas quickly in early October.

At the beginning of the season, most pots are set in shallow water, hugging the shoreline. As the season progresses, the gear is likely to be found further and further from shore, as fishermen follow the movements of the lobster population offshore into deeper water throughout the season. Toward the end of the season (March), it would not be unusual to find most of the gear in the 20-40 fathom range.

The gear is fished in exactly the same manner as crab pots: the fishing vessel pulls alongside the surface buoy, grapples it aboard, runs the line through a pinch-pulley of some kind, and hydraulically lifts the pot from the seafloor. Lobster are removed, the pot is rebaited, and redeployed. The pot is put in the same place it was taken from if it fished well, or moved to another location if it did not fish well.

The lobster catch is also marketed on a local basis, most of it going to wholesale or retail fresh markets or restaurants within a 300 mile radius of this region.

THE GILLNET FISHERY

Two types of gillnets are in common use in the Santa Barbara Channel and Santa Maria Basin and they are very distinct in the way they are fished. The first type is the set gillnet, which is set in place with anchors on the seafloor and left unattended to fish ("soaking") for a period of 24 hours or so. The second is the drift gillnet, which is a floating net with a lighted buoy at one end, attached to the fishing vessel at the other end (**Figure 4**). Each of these types of gillnets will be considered separately.

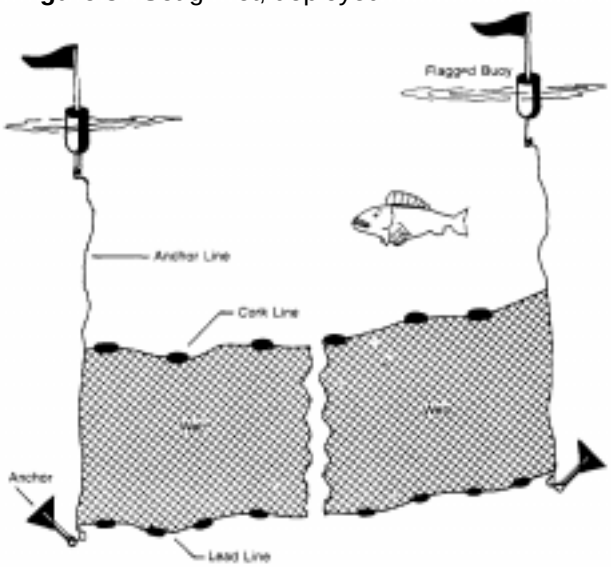
Set Gillnets

Since 1994, set gill nets have been banned for use within State waters, except in certain areas where deepwater rockfish nets are now being set. The species sought by these set nets are halibut, seabass, angel shark, other sharks, rockfish, queenfish and kingfish.

A set gillnet is attached to an anchor-and-buoy line at both ends (**Figure 3**). Commonly, gillnet buoys have flags marking the ends, for ease of visibility. Set gillnets range in length from a hundred yards to a half mile or so in length, depending on how may 'gangs' or pieces of net webbing are hung together between anchor lines. The net is set at some time of day, or night, and usually retrieved within 24 hours. Fish are taken from the net as it is pulled aboard, or worked over the deck and redeployed in place, depending on whether the net is to be relocated or not. As in the crab and lobster fishery, the decision to relocate gear is based on the catch rate of the net in the current location. Nets may be arranged so the net material itself

is close to the surface, at midwater, or near the bottom.

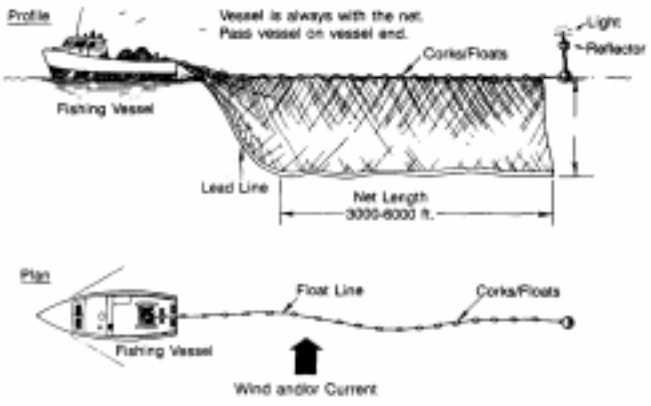
Figure 3. Set gillnet, deployed.



Drift Gillnets

This type of gillnet is not left unattended, and most often, one end of the drift net is attached to the fishing vessel. The drift net fishery operates in a much different area of the Santa Barbara Channel and Santa Maria Basin regions than the set net fishery does. Fish species sought in this fishery are swordfish and thresher shark, but some incidental catch of other pelagic species like opah is also now common since a strong market is developing for such species.

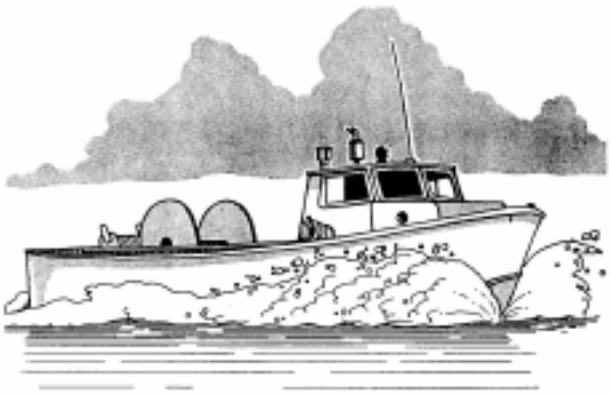
Figure 4. Drift Gillnet – Structure of Gear.



Drift nets are often much longer than set gillnets, and may be as long as a mile or mile and a half (**Figure 4**). This is significant from a gear interaction viewpoint because drift gillnet vessels may have restricted ability to maneuver similar to geophysical survey vessels with a 1-2 mile long cable out. The end of the net not attached to the fishing vessel usually has a radar reflector/lighted buoy attached to it, but may not be immediately obvious because it is so far from the vessel. Since drift gillnetting is usually done at night, and often during the darker phases of the moon, this compounds the necessity to be aware of the configuration of drift gillnet operations. Normally the vessel will be at the leeward end of the drifting net equipment. A drift gillnet can be fished anywhere from right at the surface to 30 or 40 feet below the surface.

The vessels used in both the set and drift gillnet fisheries vary in size and shape, but might be classified into two categories: 1) smaller (28-40 feet), faster craft similar to the crab and lobster vessels commonly in use in the region, and 2) larger (40-60 feet), more traditional fishing hulls. In either of these cases, the gillnet boat is readily distinguishable from other vessels of similar design and size by the presence of a large (4 to 10 feet) reel on which the gillnet is spooled when not in use (**Figure 5**). This reel may be mounted on a fore deck, or aft deck.

Figure 5. Vessel- Gillnet.



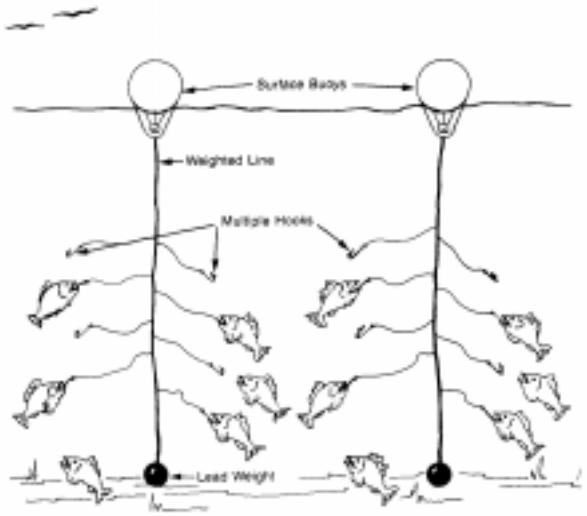
THE HOOK AND LINE FISHERY

This fishery primarily targets several species of rockfish, such as the red (vermilion), bocaccio, chili, and several others; incidental catch includes rocky reef associated fish such as lingcod and cabezon. The fishery has no seasonal restrictions, but is most active during the fall and winter months. This fishery as it exists in the Santa Barbara Channel and Santa Maria Basin is a "fallback" fishery for some of

the fishermen who enter it, since many of these fishermen also fish in other fisheries during other times of the year. Some boats however, operate hook & line gear as their primary and only fishery. As such, a variety of vessel types and sizes are involved in the fishery, ranging in size from weekend skiffs with rod and reel to larger commercial vessels from other fleet types, using buoyed, vertical longline techniques.

Most often, hook and line fishermen use their fathometers to seek out relatively deep water rocky outcrops having "stacks" of fish showing over them. A buoyed vertical longline with groups, or "gangions" of baited hooks on them is placed in the water where they find these “stacks” of fish (**Figure 6**). The lines are then retrieved, any fish hooked are removed, the hooks rebaited, and the process is repeated. Since it is not always possible to tell exactly where the gear is deployed near the boat, a 1/4 mile clearance around working hook and line vessels is advisable.

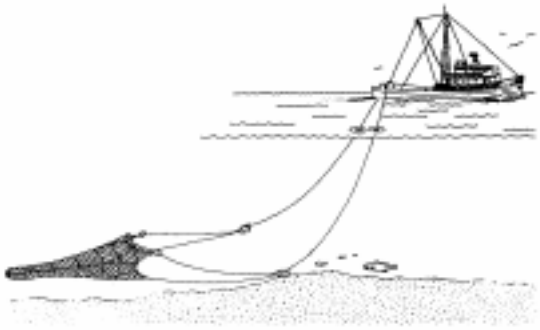
Figure 6. Hook and Line Gear, Deployed.



THE TRAWL FISHERY

The trawl fishery, in distinct contrast to the crab, lobster, and set gillnet fisheries, is a mobile fishery in which a trawl net or double net rig is towed behind the fishing vessel at slow speed, either in midwater, or, more commonly in this region, along the bottom, giving the name "dragboat" to the trawl fishing vessels here (**Figure 7**). Most of the vessels are large for commercial fishing vessels of this area, ranging from 40 to 80 feet in length. These vessels are readily identifiable when the net is not deployed because of the net 'otter boards' or 'doors' which are usually hung near the stern of the vessel, and the single boom and winch for net retrieval usually mounted forward on the open stern deck. Some draggers use a Gulf-style double net rig (twin trawlers) which is towed from the ends of two heavy outrigger poles readily visible extending laterally 20-30 feet from the beam of the boat. The species sought by trawlers or 'draggers' are ridgeback shrimp, spot prawns, pink shrimp, rockfish, various species of sole, and sea cucumbers. Seasonally, the trawlers are allowed to drag in shallower state waters for halibut, and incidental catch of shark and some other fish is also allowed.

Figure 7. Trawl.



The trawler deploys the net in areas in which fish are noted on the fathometer, or where trawling has been successful before. Depending on the species sought, and season, this can be anywhere from the 50 to 150 fathom depth contour along the coastline, along the Channel Islands, and along topographic features of the seafloor in midchannel at appropriate depths. In the Santa Maria Basin, draggers may work out in waters as deep as 400 fathoms in their search for various species of sole. The net is slowly lowered to the bottom (or midwater), held open by two large 'otter boards' or doors attached to the leading edge of the net funnel. The vessel then navigates along a depth contour at a slow pace (a few knots) through the dragging grounds for several hours. The net is then picked up off the bottom and retrieved on deck with a hydraulic winch and boom. The fish are emptied from the cod (trailing) end of the net, sorted, and the process is repeated.

Trawlers are not readily maneuverable when the net is deployed for several reasons. First, the net is on the bottom in relatively deep water, and

can be up to a mile behind the vessel. Second, the trawlers often work on the top edges of steep drop-off slopes; to turn into deeper water would force the net to drop off these slopes. This causes loss of fishing time since the net has to be picked up and reset. Similarly, rocky outcrops, wrecks, and abandoned wellheads or other debris are located randomly with respect to the trawl grounds. These features are hazards to the dragger because of their potential to snag and hang up the net. Most of the trawlers are aware of most of the snags to avoid in their favored grounds, by trial and error. Knowledge of these snags also limits the potential maneuverability of the dragger when towing a net, because to turn in to such a snag may mean loss or damage to the net, and potential hazard to the vessel itself if the hang is significant and/or weather sea conditions are unfavorable- Since turning into such obstructions would be hazardous, most draggers would have to stop towing and pull gear in rather than turn.

THE PURSE SEINE FISHERY

This fleet is based primarily in ports to the south of Santa Barbara; mainly in Ventura Harbor and San Pedro (Los Angeles Harbor). The species fished are primarily pelagic, such as anchovy, mackerel, and bonito. A major squid fishery has also developed in the past few years. Because purse seiners follow schools of these pelagic fish, it is difficult to predict where the fleet will be at a given time. Though the season is open all year, the Department of Fish & Game sets catch quotas. When these are filled, the fishery is over for that year unless an extended quota is subsequently issued.

The vessels, in the 35 to 70 foot size range, are distinguishable by the extra pursing skiff usually carried astern, and the tall boom and winch for pursing and hauling in the purse seine itself (**Figure 8**). A much larger "power block" will normally be at the top of a purse seiner boom than the block seen atop a trawler boom. When a school of anchovy, bonito, or mackerel is spotted, the vessel maneuvers into position near the school and launches the skiff, which drags the net around the school of fish and back to the mother vessel. The purse line of the net is rapidly winched in to close the bottom of the net (forming a "purse") to prevent the school of fish from escaping downward (**Figure 9**). The entire net is then brought in with a power block and winch. A successful set and haul usually takes from 30 to 90 minutes, depending on the size of the fish school, weather, and other factors. During the pursing process, the purse seine vessel is not maneuverable and can be considered effectively dead in the water. It should therefore be given the appropriate clearance due a vessel in such circumstances.

Figure 8. Vessel – Purse Seine.

THE DIVE FISHERIES

Commercial divers in the Santa Barbara Channel primarily seek sea urchins, although a small dive fishery has recently developed for sea cucumbers. Divers usually work rocky reef areas in waters no deeper than 20 fathoms, since the two primary species sought are distributed in that depth range. Historically the coast was dived extensively for abalone and urchins, but the primary grounds for sea urchins is now around all of the Channel Islands. Some urchin divers still do work the coastline, but the majority of the dive fishery grounds are currently at the islands.

Figure 9. Purse Seine.

Commercial dive boats are usually small, fast vessels from 22 to 32 feet in length. Normal operations can be either anchored or "live-boat". One to several divers may be in the water. A 'tender' or deck hand on deck operates the vessel and diver air compressor, and tends the divers air hose and game bags. These dive

vessels are clearly marked with Department of Fish & Game identification numbers. The prefix "SU" indicates a sea urchin permit.

Typically the diver will work a "bed" of urchins until his bottom time is exhausted or the bed is fished of all legal size urchins. Then the diver will decompress if necessary, surface and spend a period of time on deck, or move to another location. Clearance of at least l/4 mile of a dive vessel in operation is advisable, because a diver can be in any direction relative to the dive vessel.

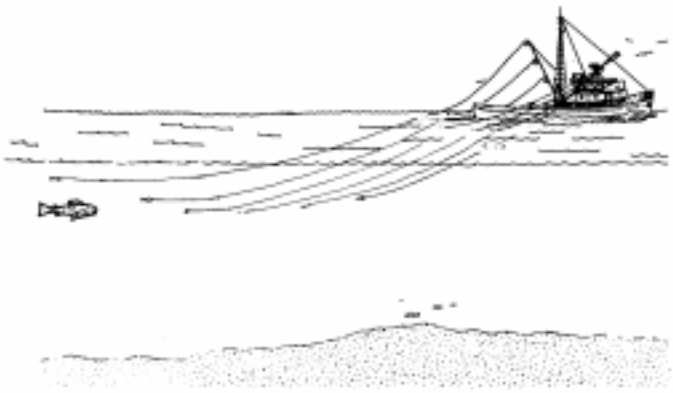
MARICULTURE AND RESEARCH OPERATIONS

Along the coast of the Santa Barbara Channel near Santa Barbara, at least nine different mariculture leases are scattered within the three mile limit (state waters). Each of these operations has a slightly different purpose, such as the commercial growing of kelps, harvesting edible mussels, growing oysters, or abalone, and/or a number of other species. The one thing all of these leases have in common is a fixed marker buoy, or several fixed, permanent buoys or rafts which locate the lease for the operator and the permitting authority (the Department of Fish & Game). Likewise, there are fixed buoys in place for various research institutions throughout the west coast, gathering information on the oceanography or ecology of the Santa Barbara Channel.

THE TROLL FISHERY

Trolling for salmon, albacore, and occasionally bonito is done primarily in the Santa Maria Basin, and to a lesser event in the Santa Barbara Channel, depending on where these fish are from year to year. A troller is most often a relatively small vessel (from 20 to 40 feet long) equipped with at least two laterally deployed booms or arms of some kind to which are attached several trolling lines (**Figure 10**). A baited hook and flasher (or several hooks) is attached to the end of the trolling line, and a weight is attached ahead of the hook and flasher. Multiple sets of this gear trail 100 to 300 feet behind the active troll vessel. The troll lines are tended regularly to remove hooked fish from lines and the lines are reset. Trollers work in highly variable areas, since this fleet targets highly migratory and widely ranging fish. As in the hook and line fishery, trollers often are in another fishery, and enter the troll fishery in the off-season of their principal fishery.

Figure 10. Troll.



FISHERIES IMPACTS OF EXPLOSIVES USED IN PLATFORM SALVAGE

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VILLERE REGGIO, Presenter
Biologist, Minerals Management Service, Gulf of Mexico OCS Region

There are upwards of 5000 oil and gas structures in the Federal and State waters of the Gulf of Mexico. A recent average showed more than 100 removals occur each year. Sixty-six percent of these structures are removed with explosives. Typically, the deck of the offshore platform is cut manually with torches and lifted onto a materials barge. Explosives are lowered down the hollow pilings and conductors to a minimum depth of 5 m (15 feet) below the mudline as required by Minerals Management Service. Explosives are detonated, thereby severing the pilings and conductors which, along with the jacket, are removed from the seabed.

One consequence of using underwater explosives is a negative impact on marine life at the platform, particularly fish. This report presented preliminary results from Dr. Bull's research assessing the fish mortality at six platform removals between August 1993 and September 1995. Computed results for red snapper reveal that less than 1% of the annual Gulfwide harvest of this species is due to explosive platform removals. Study sites spanned the Louisiana coast from the western border to the Mississippi Delta. Water depths ranged from 14 to 28 m (45-92 feet).

Mr. Reggio commented on the relationship of petroleum platforms with the evolution of offshore fishing over the past 50 years. Independent research, and over 20 years of personal investigations and observation, has indicated offshore petroleum structures have had a profound, pervasive and long-term impact on fish and fishing in the north-central and western Gulf of Mexico. Platform removals are now routinely considered for reuse as artificial reef developments in water depths from 15 to 106 m (50-350 feet). Through toppling, relocation, and partial removals 35 oil companies have cooperated with the Gulf States to create over 100 planned and permanent artificial reefs (Rigs to Reefs). Ongoing research supported by the MMS Environmental Studies Program, in cooperation with public universities and private contractors, is helping to define the ecological, social, and economic consequences of petroleum platforms on fish and fishing with special emphasis on their future use as dedicated artificial reefs.

EFFECTS OF DECOMMISSIONING ACTIVITIES ON MARINE BENTHOS

LERAY A. DE WIT
Consultant in the Marine Environmental Sciences

Since the 1960s, when the first platforms went into the Santa Barbara Channel, marine scientists have been interested in the succession of biota on and around those structures. While the newer platforms are in water depths exceeding 400 feet, the older ones are in shallower water, so the entire structure was within the photic zone, generally defined as the upper 200 feet of water. These structures, comprising a series of steel legs and cross-members, provide attachment substrate; a study in the Gulf of Mexico estimated that 3-4 acres of hard surface was added for an oil and gas platform placed in 150 feet of water. Additional "hard substrate" is also realized on the seafloor below the platform where cuttings are discharged and where the shells from attached mollusks settle after they are dislodged from the structure.

Before the effects of decommissioning and removal of oil and gas structures can be discussed, it is important to remember that the platforms and pipelines are "artificial substrates" and the communities that develop on them are a direct result of the habitat being there. Therefore, consideration should be given to the question, "Is it better to leave a structure and the associated biota in-place or return the area to the way it was before placement?" It is not the intent or objective of this paper to answer that question but to provide an overview of the organisms associated with these structures and the potential effects of various decommissioning and removal options on them.

Studies on the Santa Barbara Channel platforms have shown that fairly distinct "zones" of epibiota (attached organisms) develop relatively quickly. An upper zone (to approximately – 20 feet) normally supports substantial mussel and barnacle growth. That fouling community has been documented to be from 1 to 4 feet thick. An interesting sidelight is that mussels up to 1 foot long have been observed on Santa Barbara Channel platforms. Below that to at least the –120 foot depth, the jewel or strawberry anemone (*Corynactis californica*) generally dominates the attached community. Intermixed with that anemone are soft corals, hydroids, and various mollusks. Few seastars are usually on platforms above the area where anemones are abundant. The consensus is that the stinging cells in the anemone's tentacles preclude seastars from moving over them. This may also partially explain the abundance and relatively large size of the mussels above the anemone band since seastars are the principal predator of mussels. Detailed studies have recorded over 200 species of epibiota on Santa Barbara platforms.

On the seafloor surrounding the platforms an equally dramatic biotic change occurs as a result of the presence of the platforms. As stated earlier, the drill cuttings that are discharged from the platform and the mussel shells that are removed during storms or due to their own weight are deposited on the seafloor below the platform. These "mounds" have been estimated to be almost 40 feet deep in some areas of the Channel with shell talus comprising almost half of that height. Studies by scientists in the 1970's estimate that 15,000 to 30,000 feet ^{2} of seafloor had been "enriched" around platforms Hilda and Hazel.

Irrespective of the actual area, it is clear that a new substrate, which supports a vastly different epibiota community than the surrounding sedimentary bottom, is created as a result of this deposition. Depending upon the depth of platform, that community consists of crabs, shrimp, seastars, sea cucumbers, anemones, and other organisms not usually found in the natural habitat. One study of platform Eva off Huntington Beach in the 1970's found that 36,850 pounds of seastars, comprising 19,000 individuals of at least four species, were within a 7,000 feet^2 area under the platform. An additional 5,000 sea cucumbers (2,400 pounds) were also documented within the same talus bed. Needless to say, the shell substrate and abundant organic material provides a good habitat for certain benthic organisms, some of which are of commercial interest.

The exposed portions of pipelines also provide solid substrate, albeit not the area provided by platforms, within the generally sedimentary seafloor of the Channel. While much of the deeper water pipelines bury themselves into the soft sediments, nearshore sediments are more compact and thus support the pipelines, allowing epibiota to attach to the exposed surfaces. In addition to the pipelines themselves, armor rock, usually placed over the pipelines from –25 feet to shore, also provide substrate for epibiota attachment. Within the nearshore areas, generally to about –60 feet ., kelp and invertebrates similar to those found on natural rock reefs in these water depths, attach to the pipelines and rock cover. Scallops, mussels, and species of non-commercial interest are commonly found on the rocks.

The spaces between the armor rock also provide habitat for crabs, lobster, and several species of fish, some of which are also of interest to commercial and sport fishermen. My personal observations within the Channel have revealed aggregations of angel sharks along the pipeline oil from platform Helen to shore and I and several other observers have documented abundant growth on the pipelines and rock cover of other pipelines within the Channel. It is important to note that most pipelines are buried through the intertidal zone and therefore provide no longterm attachment substrate there. However, in subtidal areas where the pipelines and/or armor rock is exposed, biomass on the pipeline far exceeds that of the surrounding sedimentary bottom. In a study in which I was involved, it was found that the epibiota biomass of the submerged portions of the rocks on Rincon Island was 50 times that of the infauna in the sedimentary habitats around the island.

Before the effects of removal can be discussed, a brief description of the effects of the marine activities that occur prior to the actual removal is required. These include effects of vessel anchoring, divers, and the cutting of the structures. While each activity is likely to be fairly local in its effect on the benthos, that effect should be including when comparing disposal options.

Multiple anchors are usually used by vessels engaged in platform or pipeline removal. Anchoring does indeed result in the burial of organisms directly below the anchors as well as the resuspension of sediments when the anchor contacts the seafloor and when it is removed. In addition, the lines or cables connecting the anchors to the vessels have been shown to sweep across the seafloor and damage the substrate and/or attached biota. The area of effect is usually limited to a triangular zone with the apex at the anchor, widening toward the vessel. Due to wave action in the shallower waters, nearshore anchoring normally requires that anchors be set at a distance 10 times the water depth of the vessel. Therefore, a boat working in 25 feet of water could be expected to place its anchors as much as 250 feet away. Deeper water areas usually require less "scope" and therefore the area of impact could be expected to be smaller.

Diver operations, including jetting of sediment from around pipelines, cutting pipelines and the smaller cross members of the platforms, and placing charges, can also result in impacts to the benthic community. In my experience, I have observed apparent diver-related impacts to include some damage to kelp plants near the pipeline cut points, removal of attached epibiota around cut points of platform cross members to access the jacket, and scraping of solid substrate habitats with equipment. My observations indicate that diver-related effects are very local and relatively insignificant.

Cutting of structures via mechanical or explosive methods also appears to have a relatively local effect on the benthos. The effects of cutting are usually limited to a relatively narrow band around the structure and if the piece is to be removed anyway, the loss of those organisms within the cut area is irrelevant.

No matter how much of the subsea portions of the structures is removed, the attached benthos will, of course, be removed also. Even if the structure is used to create an artificial reef, the attached community will change relative to water depth, available light, and suspended sediment at the new location. The orientation of the structure is also likely to change from upright to horizontal, thus organisms attached to the upper portions of the platform are likely to exposed to greater water depths and decreased light. Again, depending upon the water depth, a platform laid on its side could be expected to develop a fouling community similar to that found at that water depth when it was upright, resulting in a net decrease in the number of habitats the structure supports but increasing

the arial cover of the habitat(s) at those depths. Also to be considered in partial removal is the fact that the near surface areas normally support the largest attached biomass per unit area and it is the mussel community that provides much of the organic material and substrate input to the talus bed beneath the platform. Removal of the upper portions of the structure would eliminate this important community.

I have found that pipelines laid across hard substrate, tend to wear a "groove" into the rock. It is this abrasive action that likely precludes epibiota from developing within the groove. On the other hand, the pipelines themselves provide a viable substrate and therefore it is likely that the removal of the pipeline should not result in a net loss of epibiota within rocky habitats. In sedimentary habitats the pipeline may provide the only solid substrate within the area and therefore the complete removal here would be expected to result in a net loss of organisms and biomass, even when the recolonization of the sediment under the pipeline occurs. In the sandy intertidal zone, assuming that the pipeline is exposed only during extreme erosion events, there is no substantial habitat value associated with the pipeline and therefore removal should result in no substantial long-term change in the biota.

In conclusion, the following summarizes the effects of each decommissioning / removal option identified in the agenda of this conference. Generally, removal of the upper portions of a platform results in the loss of the most productive area and could be expected to eliminate the source of talus formation around the platform. Pipeline removal effects are most detrimental in areas where the exposed portion represents the only solid substrate and has the least effect within the intertidal areas.

Full Removal Including Recontouring the Seafloor

Loss of all biota and habitats that have established as a result of the structure's presence. This of course assumes onshore disposal and scrapping of the entire structure.

Non-Removal (Alternative Use)

Assuming no changes in discharges from what had existed, the structure-associated biota and the epifauna on the talus mounds, could be expected to continue to develop into a community that differs from the surrounding sedimentary bottom and open-water biota.

Partial Jacket Removal with Artificial Reef

Since is has been shown that the greatest per unit biomass of epibiota is that in the upper portions of the platform, the loss of that portion would be expected to result in the reduction of talus-supplying organisms and the loss of the organisms associated with the portion removed. Placement of the removed structure into similar water depths would be expected to result in continuation of epibiota development and the possible increase in benthos around the area where the structure is placed. The probability is that no net gain or loss from current conditions would be realized.

Remove Jacket to Artificial Reef Site

As in the partial removal option, the water depth and other conditions will dictate the development of the benthic community on and around the structure once it is placed at the artificial reef site. Highest epibiotic productivity could be expected when the artificial reef site is within the photic zone with some portions at or near the surface.

Deepwater Disposal of Jacket

Deepwater has yet to be defined in the context of platform disposal, therefore, as previously discussed, the benefits or negative effects of this option will be driven by the depth of water and the amount of natural solid substrate within the region. Assuming that deeper water equates to softer sediments, less of the structure would be exposed than in shallower areas. Enhancement of benthic productivity of the area could be realized from the presence of the platform with losses of existing biota limited to that buried beneath the structure.

Full Pipeline Removal

Removal of the entire pipeline will not only reduce available solid substrate, but will also result in impacts to the benthic community from removal-associated activities. Unless there is a safety issue, rock-covered pipelines should not be removed, however, removal of those pipelines that traverse natural rocky habitats is

likely to result in reestablishment of biota within the area immediately around the pipelines. Generally, it is expected that the impacts to benthic communities would be greater from complete removal of pipelines that those associated with allowing them to remain in-place.

Partial Pipeline Removal

As previously stated, consideration should be given to the habitat through which the pipeline traverses and the potential long-term effects of removal vs. remaining in-place. Exposed pipelines in offshore sedimentary habitats should be allowed to remain in-place.

Some general conclusions that focus on the potential effects of various decommissioning options on the marine benthos of southern California are:

1) the habitats and associated biota present on and under the platforms and on pipelines are usually unique since the surrounding area is sedimentary;

2) removal of even part of the structures could be expected to alter the benthic and epibiota community in the area;

3) the effects of removal-associated activities must be considered in assessment of impacts of removal but are expected to be relatively local and short-term; and

4) creation of artificial reefs from the removed structures could be expected to enhance the benthic and epibiota communities of the reef site but removes those communities from there present, offshore locations.

Removal of oil and gas structures and identifying the best use of the material remains a controversial topic. The organisms that attach to the structure or benefit from its presence will suffer some impact with removal of any portion. Weighing the benefits and losses to the benthic and epibiota communities is only part of the overall consideration and, I might so boldly add, a relatively minor one when compared to the other technical and cost issues that must be included in the equation.

DISPOSITION SESSION

Long-term Environmental and Socio-Economic Effects Related to the Disposition of Oil and Gas Facilities

COMMERCIAL FISHERIES
LONG-TERM EFFECTS OF OFFSHORE OIL AND GAS FACILITIES DECOMMISSIONING

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INTRODUCTION

Decommissioning of offshore oil and gas facilities and the long-term effects of various disposition options have both direct and indirect impacts on nearly every commercial fishing fleet operating along the south-central and southern California coast. To gain an understanding of the disposition issues and concerns of the commercial fishing industry, interviews were conducted in seven ports with forty-three vessel owner/operators, each representing an individual fishing business. The fishing fleets represented included troll, hook and line, drift and set net, purse-seine, trawl, trap, and dive. The interviews were conducted either in person or by telephone during the summer of 1997 with captains from Morro Bay, Port San Luis, Santa Barbara, Ventura Harbor, Channel Islands Harbor, Port Hueneme, and San Pedro Harbor. Background information on current fishing operations and fleet characteristics was acquired through interviews with six fisheries resource managers and representatives of eight commercial fishing organizations (listed in Appendix A).

THE OCEAN SETTING

The shift in the California coastline in the area of Point Conception, Santa Barbara County, from a north-south to an east-west orientation, has a significant influence on the weather, oceanography, and diversity of marine life in the Santa Maria Basin north of the Point and the Santa Barbara Channel to the south-east. Fish and shellfish species favoring both cold and temperate seas inhabit this productive marine transition zone. Further south, from the Los Angeles Bight to the Mexican border, the waters are typically warmer and, in years of El Niño events, there is often (depending on the strength of the event) a rise in ocean temperatures and movement of warmer-water marine species to the north. The changeable nature of the ocean in this area, and the diversity of marine species have led to the development of a very dynamic and adaptable commercial fishing fleet.

CHARACTERISTICS OF THE FISHING FLEETS AND FISHERMEN

The demand imposed on southern California fishermen to adapt to changing conditions along with the unique variety of fish in the area (over 20 commercially harvested species) have prompted many captains to utilize a combination of gear types and methods to maintain productive fishing enterprises. An excellent review of the region's fishing vessels, gear types, methods, and seasons is given in the Joint Oil/Fisheries Committee and Liaison Office (1986) publication, "A manual for geophysical operations in fishing areas of south/central California". As this publication is currently out of print, an abridged and updated segment of the publication describing the south coast fishing operations is reproduced in this volume (See p. 97 Fusaro & Richards).

Southern California commercial fishing vessel owners and operators are typically small independent businessmen with vessels ranging from 18 foot skiffs to 100 foot purse seiners and investments from $10,000 to over 1 million dollars. In 1997, registered commercial fishing vessels from Santa Barbara to Orange County numbered approximately 1375. Over 1900 commercial fishing licenses (including both captains and crewmen) were issued in the same area (David Ono, CDF&G, pers. comm.).

Professional fishermen, those who derive the majority of their income from fishing, and dual career fishermen (who work at other jobs and fish seasonally) are estimated to number over 300 in the tri-county area (San Luis Obispo, Santa Barbara, and Ventura Counties). This number does not include "sport-commercial fishermen" (hobby fishermen or retired persons

fishing part-time) or commercial sea urchin divers, a large fleet generally working out of the area of decommissioning activities. (Dr. Craig Fusaro, pers. comm.).

DECOMMISSIONING OPTIONS

Of the 43 commercial fishing vessel owner/operators interviewed, the vast majority (95%) expressed the following opinion:

> **"The oil and gas industry should honor agreements made with state and federal government agencies and other marine resource users to remove all offshore structures and equipment from the abandoned leases and return the seafloor to it's original state."**

This opinion was expressed in many different forms and paraphrased by the author. It reflects the perception of many in the fishing industry that during the leasing process, agreements were made that would assure the removal of offshore structures and that the seafloor would be returned to the state it was found prior to offshore oil and gas development. This perception, is apparently incorrect in regard to the Minerals Management Service's OCS Oil and Gas Regulations on decommissioning offshore facilities as they give the MMS Regional Director certain discretionary authority to "depart from the operating requirements of the regulations" and allow alternate uses of the offshore structures with the concurrence of other regulatory agencies (See Appendix I: Regulatory Framework…, page 197, this volume).

If the decision is made to allow all or portions of the offshore structures to remain in place or to be moved to another at-sea location, the fishermen interviewed provided the following comments and opinions on the various decommissioning options, starting with the least desirable and ending with the most tolerable:

Option #3: Partial Jacket Removal (Topping to 85 feet below the surface)

This was considered the least desirable and most dangerous option by the majority of fishing captains interviewed in each of the different fleets. The following is a summary of the comments and information provided on the impacts of this option on each type of fishing operation:

Troll Fishery - Salmon trollers tow several sets of lines with numerous lures or baited hooks weighted by large lead sinkers ("cannon balls"). These lines are often fished to depths of over 300 feet and fishermen try to avoid any submerged obstructions that would snag their gear. If existing platforms are cut to 85 feet below the surface, trollers would have to stay clear of the remaining structures. Troll fishermen expressed concern over loss of fishing area and potential gear loss if rigs were topped and the remaining structure left at 85 feet below the surface.

Hook & Line - Hook and line fishermen have similar concerns as a common technique is to deploy buoyed vertical longlines with groups or "gangions " of baited hooks near an identified "stack" of fish. The lines are then retrieved and the fish removed. These lines are also weighted with 20 to 30 lb. weights and fished at depths of several hundred feet. The primary objections of hook and line fishermen to this option are the potential for gear loss and loss of fishing area.

Set & Drift Gill Net - Set gill nets are not used frequently in the area of offshore oil production, but drift gill nets are deployed during the thresher shark, swordfish, and white sea bass seasons. The drift net, which is attached to the fishing vessel at one end, may be up to a mile long and 200 feet deep, though the depth will vary according to the ocean conditions and areas fished. Captains of drift net vessels are particularly concerned about submerged obstructions, as they generally work at night and have restricted mobility when the net is out. The direction and speed of the drift is determined by the ocean currents and a boat may cover 10 or 15 miles in a night of fishing. The potential for major loss of gear and fishing time, the safety risk of being snagged and immobile at night, as well as loss of fishing areas are the primary reasons drift net fishermen feel this is an unacceptable and dangerous option.

Trawl Fishery - Trawl nets are fished either in mid-water or on the bottom with bottom trawling being the most commonly used in south-central and southern California. This fishery is particularly vulnerable to any type of bottom obstruction and fishermen may spend

years charting these obstructions or “hangs” to avoid damage or loss of gear. By cutting the rig down to 85 feet below the surface, trawlers lose the ability to see the exact location of the remaining structure. If the structure is marked with a surface buoy, they will still have to give the area a wide berth, thus losing considerably more fishing area than if the rig were left with at least part of the topside intact. Potential gear loss, becoming snagged and immobile (a major safety risk), and losing additional fishing areas are the main objections trawlers have with this option. Some trawlers have also noted that oil-field marker buoys themselves have become navigation hazards when maintenance is poor and they lose lights, radar reflectors, or become partially or fully submerged.

Purse Seine - Purse seiners, a highly mobile fleet traditionally seeking pelagic species (anchovies, sardines, mackerel, bonito, and tuna) have recently increased in number on the south coast due to several good seasons of squid availability and sound markets. Vessels from the central California and Washington have joined the San Pedro, Port Hueneme, and Ventura fleets to fish in the Santa Barbara Channel. Squid fishing is cyclic and the warmer waters anticipated this season (1997-98) may diminish squid production and prompt fishermen to put more effort in pursuing the pelagic species throughout the southern region. With nets that can be fished to depths of 360 feet and “pursed” (the bottom of the net closed) at a depth of 180 feet, seine captains have the same concerns about snagging bottom obstructions as the drift net and trawl fishermen: primarily damage and loss of gear, the safety risk of being immobilized, and the loss of fishing area.

Trap Fisheries - Lobster and crab trap fishermen often work near some of the shallower rigs and would probably be able to avoid problems if the underwater structures were carefully marked with buoys. Since traps may move or “walk” during storms or rough ocean conditions, more problems (such as snagging or loss of gear) might occur with the other options such as toppling or moving the jackets to inshore areas as artificial reefs. Increasing boat traffic to and from an artificial reef site could also adversely affect trap fishing operations.

Option #4: Partial Jacket Removal (Toppling in place - artificial reef)

A majority (over 90%) of the fishermen interviewed felt this was also an undesirable and risky option. They expressed the same concerns (gear loss/damage, safety risk of becoming snagged and immobilized, and loss of fishing area) as with topping to 85 feet. Toppling certain deeper water rigs may not be as much of a problem to the fleets that fish off the bottom, but many of the shallower platforms are in prime commercial fishing areas, particularly for trawling and purse seining. Several fishing industry representatives questioned the reasoning (and scientific basis) for toppling the platforms in place to be used as artificial reefs, rather than carefully selecting areas and reef materials that would provide beneficial habitat for enhancing fish production.

Option #6: Deep Water Disposal of Jacket

This option was unacceptable to all but a few (7%) of the fishermen interviewed. Most captains hold a strong bias against using the ocean as a dumping ground.

Option #5: Move Jacket to Artificial Reef Site

This was considered a possible option by most fishermen (though about 10% favored total removal). They would consider this option on a case-by-case basis with well defined goals for the project, careful study of potential reef sites, and development of site criteria considering both ecological and fisheries aspects. Area commercial fishermen would like to be fully involved in the planning process along with the other stakeholders. Again, many fishermen questioned whether the oil platform jackets are constructed with the proper materials to build viable, long-lasting reefs.

Option #2: Non-Removal: Multiple Use

This was considered the most tolerable option, especially if a portion of the platform topside remained above the water so it was easily seen by day and picked up by radar in the fog or at night. The platform lights at night also help fishermen and other mariners in navigating.

The following benefits to this option were expressed by 90% of the captains:

Shell mounds which remain on the seafloor after the removal of the "4H" platforms in state waters off Santa Barbara County have continued to be a problem to the commercial trawl fleet. By leaving the platform intact, with the topside visible, fishermen would have a better chance of navigating and fishing around the structures and would not have to be concerned about "hanging-up" on the shell mounds or losing additional fishing grounds.

Most of the other (non-trawl) fleets would also be able see and navigate around the rigs better if they were left intact and exposed above the surface rather than cut off or toppled. They would be significantly easier to see at night if the topsides remained lit.

Many of safety risks and potential gear damage mentioned above would be reduced if the platforms remained visible to fishermen.

Several commercial fishermen suggested that the fish populations now associated with the rigs might have better protection if the rigs remained standing rather than being cut off below the surface or toppled.

Non-removal, in fact, was preferred by nearly all of the fishermen interviewed if one or two platforms were carefully selected to serve as weather stations, especially at the west end of the Santa Barbara Channel or in the Santa Maria Basin. Other suggestions for multiple-use of the oil and gas rigs included: a Coast Guard rescue station; a fisheries and aquaculture experiment station, long-term ecological monitoring site, oceanographic research station, and a site for alternative energy production (utilizing wind, wave, and currents). A majority of those interviewed desired to be included in discussions of the costs and benefits of these potential uses. The question of liability continues to be a primary concern of the fishing industry members.

Pipelines

Leaving pipelines in place after decommissioning the platforms would pose problems for certain commercial fishing operations depending on the areas and the condition of pipes. Those pipelines with snags (rough or exposed flange connections), areas of pipeline cross-overs, pipelines rising off the bottom, or disconnected ends sticking up can cause gear damage and loss to most of net fishing and trapping operations in the areas of offshore oil and gas production. Properly maintained, smooth pipes usually cause no problem for trawlers, seiners, or trappers, though fishermen expressed concern about potential long-term deterioration of the pipelines and which agency would assume liability for those remaining after decommissioning.

SUMMARY OF COMMERCIAL FISHING REPRESENTATIVES' PREFERENCES:

The majority of the 43 fishermen interviewed favored Option #1: Full removal of platforms and associated debris.

Alternatively, if regulatory agencies decide to allow the offshore structures to remain in place or to be moved to another at-sea location, then the majority favored Option #2: Leaving the structure in place with careful consideration of multiple uses, safety risks, ownership, and responsibility for liability.

In regard to pipelines, most fishermen would accept leaving them in place with assurances that they remain snag-free and compatible to the various fishing operations, though long-term maintenance responsibility and liability should be determined prior to abandonment.

Appendix A.

Commercial Fishing Organizations Contacted:
Southern California Lobster Association
Pacific Coast Federation of Fishermen's Associations
Southern California Trawlers Association
Morro Bay Commercial Fishermen's Association
Commercial Fishermen of Santa Barbara, Inc.
Ventura County Commercial Fishermen's Association
Federation of Independent Seafood Harvesters
Sea Urchin Harvesters Association of California

Resource Managers and Biologists Contacted:
Robert Hardy - California Department of Fish & Game, Morro Bay
Christine Pattison - California Department of Fish & Game, Morro Bay
Dan Dugan - California Department of Fish & Game, Morro Bay
Maria Voikovich - California Department of Fish & Game, Santa Barbara
Kristine Barsky - California Department of Fish & Game, Santa Barbara
David Ono - California Department of Fish & Game, Santa Barbara
Marylin Beeson - California Department of Fish & Game, San Diego

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ECOLOGICAL CONSEQUENCES OF ALTERNATIVE DECOMMISSIONING STRATEGIES FOR POCS OFFSHORE FACILITIES

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SIGNIFICANCE OF STUDY

Critical to formulation of appropriate decommissioning policy is an understanding of the ecological, economic and social consequences of different decommissioning options and identification of the mechanisms by which such information is incorporated, or not, into legislation and public policy. Perhaps the most important ecological consequence of abandoning POCS facilities is a potential change in regional fish production (the biomass of fish accrued per year), which may in turn influence yields to fisheries. Hard substratum reefs represent a small fraction of the available offshore habitat in California, but are sites of high fish production. However, prior to this study, only one study provided quantitative estimates of species composition and abundance of fishes at a single platform off southern California.

STUDY OBJECTIVES

1. Quantitative description and comparison of fish assemblages on natural reefs and offshore structures.

One objective of this study has been to quantify the species and sizes of fishes associated with platforms and natural reefs. Such information is required to determine what species and life stages might be influenced by the various decommissioning options. Do fish recruit to each habitat type from the plankton (as larvae) or migrate on to one habitat type from the other as older stages (benthic juveniles and adults)? Comparison of fishes between platforms and natural reefs provides information on what stages use the two habitat types. Patterns of fish sizes over time can also provide information on how long fishes associate with each habitat type and how well they grow and survive. Such information is critical to understanding the relative value of natural reefs and platforms as fish habitat.

2. Quantitative description of the vertical distribution of fishes on platforms.

Several of the various options for platform decommissioning alter the vertical height of the remaining structure (e.g., “topping”, “toppling”, moving to different water depths). To estimate the potential consequences of these options, it is necessary to determine how species are distributed from the surface to the bottom of the platforms. Also, information on the sizes of fish at each depth can indicate patterns of recruitment and how the vertical distribution of fishes changes as they grow.

3. Quantify the net rate and direction of fish movement between platforms and natural reefs.

Fundamental to understanding the net contribution of local populations to regional production is information on the size-specific rate of migration of fishes among local, reef-associated populations. In the context of platform decommissioning, knowledge of the net direction and rate of transfer of biomass between platforms and natural reefs is crucial. For example if fish recruit to natural reefs and eventually migrate to platforms, accumulation of fish biomass on platforms would be incorrectly attributed to production at the platform habitat. Conversely, if platforms provide recruitment habitat for fish that eventually migrate to natural reefs, the

contribution of platforms to regional production may be grossly underestimated by simply measuring production in the two habitats. Movement information is also important to determine whether the loss of fish at a site is due to emigration rather than mortality. Therefore, we have conducted a tagging study determine how much and what direction (from platforms to reefs or vice versa) fish move, the rate of that movement, and net direction of exchange.

Study Area and Methods

1. Quantitative description and comparison of fish assemblages on natural reefs and offshore structures,

and

2. Quantitative description of the vertical distribution of fishes on platforms.

Over the past three summers (1995-1997), fish assemblages associated with shallow (< 33m) portions of six production platforms (Hogan, Houchin, Henry, A, B, and C) have been sampled monthly from May through October (peak periods of recruitment of most reef fishes) using diver surveys. Deeper (> 33m) portions of these platforms have been surveyed three times each year (June, August, October) with a remotely operated vehicle (ROV) outfitted with a video camera in cooperation with the Marine Technology Program at the Santa Barbara City College. Surveys conducted by divers on production platforms involve estimates of the density and size of individuals of each species along 2 m wide x 2 m tall belt transects at predetermined locations and depths. A second diver samples the same transects using an underwater video system. The video system (equipped with parallel lasers for estimating fish length) is used to increase the sample size of fish lengths and provide a standard for comparing samples with ROV video at greater depths. Belt transects of similar dimensions are sampled with the ROV while an observer logs the depth and location of transects, and identifies fish species.

Divers also locate and sample fish assemblages on the 3 shallow natural reefs closest to these production platforms during the same sampling period each month. Data collected on natural reefs are the same as that on production platforms, but surveys of natural reefs also include quantification of habitat variables (e.g., substratum type and relief, epibenthic cover, density and size of macroalgae, temperature and visibility) that might explain patterns of species abundance. The ROV is used to sample one or two additional natural reefs in deeper water between the shallow natural reefs and the production platforms.

3. Quantify the net rate and direction of fish movement between platforms and natural reefs.

Over the past two years we have begun a tagging study to estimate rates of fish movement between production platforms and natural reefs. This work is being done in conjunction with the Channel Islands National Marine Sanctuary and volunteers from the University and the local sport fishing community. We have tagged fish at four natural reefs in the vicinity of the 6 study platforms off Summerland. Fish are caught by hook and line, identified, measured, tagged with standard Floy tags, and immediately released. When necessary, their swim bladders are vented to enable fish to return to the bottom. Floy tags are similar in design to garment tags, with a number, name and phone number. This allows fishers to call and inform us of where and when they caught each fish. Tags are color coded by the reef/platform on which they were tagged and released.

Results and Implications

1. Quantitative description and comparison of fish assemblages on natural reefs and offshore structures

The species composition of fishes encountered on platforms and natural reefs differed both with respect to the presence/absence and relative abundances of some species in each habitat. Some species were only encountered on the natural reefs (listed in red color on the adjacent Table). Others were only observed on the platforms (listed in blue on the adjacent Table). However, most species occurred at both habitats types (listed in black). Particularly notable were the several species of surf perch and kelp-associated species only seen at the natural reefs, and the young recruits of many rockfish species that were only seen at platforms. Many of the species observed at both habitat types differed in their relative abundance on platforms and natural reefs (see Table below). Some of these

economically or recreationally important species were more abundant on natural reefs (e.g., barred sand bass, kelp rockfish), whereas others were more abundant on platforms. These results suggest that the removal of platforms will likely affect some species much more than others, and some species will likely be influenced little.

2. Quantitative description of the vertical distribution of fishes on platforms.

The abundance of many species varied markedly with depth along platforms. Often these depth-related differences were also related to the age/size of individuals. For example, the young of many shallow dwelling rockfish occurred only at the shallower depths sampled, whereas older stages (juveniles and adults) occurred more frequently at greater depths. These results suggest that removing the upper portion of platforms may reduce recruitment of some species to the platforms. In contrast, both the young and older stages of other species (many rockfishes including olives, widows, boccacios) occurred at depth, suggesting that recruitment and adult abundance of these species may not be reduced by the removal of the upper portions of platforms.

3. Quantify the net rate and direction of fish movement between platforms and natural reefs.

To date, we have tagged 500 fish and recaptured 50. This high return rate (10%) is attributable to the excellent cooperation by sport fishers that have called us with information on the fish they caught. Of the fish recaught, 75% were caught where they were tagged, suggesting that many of the species tagged (mostly rockfishes) remain on the reefs they were tagged. Of course, it is not clear how much movement occurs by the many fish that were not recaptured, but we hope to continue to collect information on those individuals in the future. Some species contributed highly to the individuals that do move; particularly barred sand bass and kelp/calico bass. That calico bass move more helps to explain why we see many adults on reefs, but no young recruits. These data strongly suggest that a species like this is attracted to platforms, having recruited as young elsewhere, rather than recruiting to and remaining on the platforms.

EFFECT OF OFFSHORE OIL PLATFORM STRUCTURES ON THE DISTRIBUTION PATTERN OF COMMERCIALLY IMPORTANT BENTHIC CRUSTACEANS, WITH EMPHASIS ON THE ROCK CRAB

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Offshore oil platforms act as artificial reefs by providing habitat for mussels, encrusting bivalves, sea anemones and other invertebrates. Studies of artificial reefs, in general, have centered on whether they simply attract or produce sport and commercially important fishes. We tested elements of a conceptual model describing possible interactions between offshore platforms and *Cancer* crab stocks based on ideas developed for fish populations and fishery refugia.

Using offshore platform "Holly" (Mobil) as a model system, we: 1) estimated fouling community thickness on platform conductor pipes and the rates and composition of faunal litterfall to the benthos that may provide food and/or habitat for rock crabs, 2) evaluated whether the platform is a site of rock crab production, and 3) determined if crabs aggregate beneath the structure relative to adjacent soft bottom.

The fouling community attached to Holly provides shelter and food for juvenile *Cancer antennarius*. This community of organisms, which varies in thickness with depth ($P<0.001$, One-way ANOVA), reached a maximum mean thickness of ~18 cm at a depth of 12 m and decreased to a mean thickness of ~5 cm at a depth of 24 m. Mussels predominated at depths of 6 m and 12 m while barnacles (e.g., *Megabalanus californicus*, *Balanus aquila*), encrusting bivalves (e.g., *Chama* spp. *Crassadoma gigantea*), and anemones (*Metridium senile*), predominated deeper. The bay mussel, *Mytilus galloprovincialis*, comprised nearly 100% of the mussels at depths shallower than ~9 m while large clumps of the sea mussel, *M. californianus*, were present between 9 m and 15 m.

The fouling community is also a source of organic enrichment to the benthos through "faunal litterfall". Using 38 cm internal diameter plastic circular hoops with attached fine mesh bags as faunal litterfall traps, we collected an average of from 0.08 to 2.6 kg wet weight of mussels•trap^{-1}•week^{-1} at a depth of 18 m. Dislodged clumps of *M. galloprovincialis* formed nearly 100% of this material. The topography of the bottom beneath Holly is altered by this litterfall and consists of a mound of mussel shells at least 1.5 m thick at the platform periphery. Rock crabs could be attracted to the area beneath or around Holly by increased food availability and/or habitat heterogeneity.

To identify rock crab species present and temporal patterns in crab abundance beneath Holly, standard crab traps (Fathoms Plus) were deployed monthly from the platform and every two to three months ~200 m east, south, and west of the platform. Three species of rock crab (brown rock crab-*Cancer antennarius*, yellow rock crab-*C. anthonyi*, red rock crab-*C. productus*) and the sheep crab, *Loxorhynchus grandis*, were found beneath Holly. *C. antennarius* (x=1.0 to 7.5 crabs•trap^{-1}) and *C. anthonyi* (0 to 16.7 crabs•trap^{-1}) were most abundant followed by *C. productus* and *Loxorhynchus grandis* (usually <1.5 crabs•trap^{-1}).

Cancer antennarius and *C. anthonyi* were significantly more abundant beneath Holly than on surrounding soft bottom. There was no difference in abundance among locations for *C. productus* and *Loxorhynchus grandis*. Of interest, 87% (n=254) of the *C. anthonyi* individuals trapped at the platform were females, compared with only 26% females (n=99) at the soft bottom stations, suggesting that females may prefer more heterogenous habitats than males.

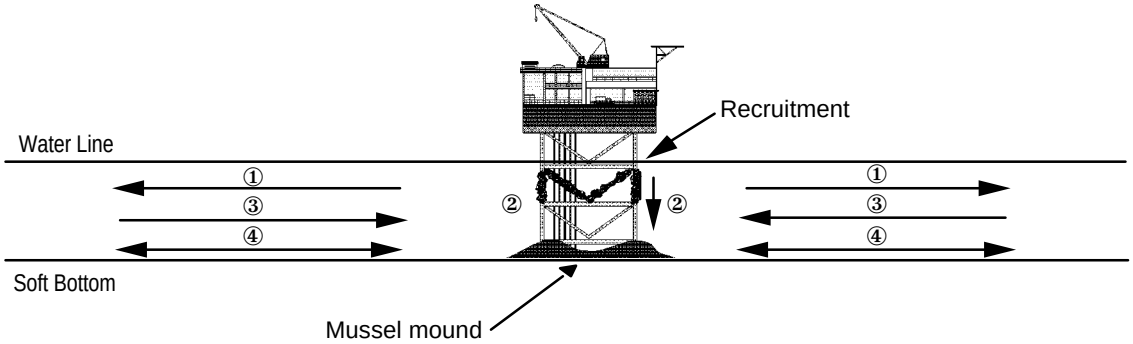
To quantify spatial and temporal patterns in the recruitment of rock crabs and in crab population structure on the platform, crabs were censused and fouling community

sampled on at least four vertical conductor pipes at three depths (12, 18, 24 m) using SCUBA every other month.

Only *Cancer antennarius* recruited to the platform. Smallest crabs (<40 mm carapace width, CW) were found within clumps of *Mytilus californianus* and were rarely seen in visual surveys or trapped. The smallest crabs remain hidden in mussel clumps and become more active at a size of >40 mm CW. Crabs of 40 to 80 mm CW were found in the open and enter traps. Larger crabs >80 mm CW were present, but were less abundant. The largest *C. antennarius* were trapped on the bottom beneath the platform . Larger crabs beneath the platform may have recruited into mussel clumps in shallow water and fallen or moved to the bottom.

Preliminary analysis of our data suggests that *Cancer antennarius*, *C. anthonyi*, *C. productus,* and *Loxorhynchus grandis*, respond differently to the presence of the platform (Figure 1). Recruitment of *C. antennarius* occurs onto the platform, but dispersal appears limited, leading to a resident population restricted to the vicinity of the structure. Recruitment of *C. anthonyi* does not occur at the platform, but members of this species (primarily females) aggregate beneath the structure. *C. productus* does not recruit at the platform and there were no patterns in the distribution of adults relative to the platform. Finally, *L. grandis* was found seasonally at the platform and at soft bottom sites, indicating that this species moves between the platform and surrounding areas.

The implications of the available decommissioning options on crab populations will vary among crab species. *C. antennarius* and *C. anthonyi* are likely to be affected most by the various removal options Complete removal (structure and mound) of the platform will result in a loss of litterfall and habitat that would directly reduce the production of *C. antennarius*. This option would also affect the distribution of female C. *anthonyi*. There would be relatively little effect on *C. productus* and *L. grandis*. Partial removal (cropping at a depth of 60 feet or toppling) would result in a loss of litterfall because much of the production of the fouling community occurs above 60 feet. Recruitment of *C. antennarius* may be reduced under this option. The aggregation of *C. antennarius* and *C. anthonyi* on the mussel mound may still occur, however, reduced food availability could affect growth rate of these species. Decommissioning of the platform in place or elsewhere, as an artificial reef, could result in a continuation of the patterns found at Platform Holly. However, these patterns may vary among platforms and reefs depending on depth and location.



Distribution scenario	Crab species			
	C. antennarius	*C. anthonyi*	*C. productus*	*L. grandis*
① Recruitment to platform followed by movement away from platform	–	–	–	–
② Resident population; produced by recruitment onto platform supports	+	–	–	–
③ Attraction/Aggregation of individuals produced elsewhere	–	+	–	–
④ Movement of individuals between a platform and surrounding areas	–*	+	+*	+

Figure 1. Summary of distribution and movement scenarios for the rock crab, *Cancer* spp., and the sheep crab, *Loxorhynchus grandis* in relation to offshore oil platform Holly. + = data consistent with scenario, - = data inconsistent with scenario, *hypothesized, insufficient data.

ENHANCEMENT OF PLATFORMS AS ARTIFICIAL REEFS

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Enhancement refers to the addition of materials which can provide increased and/or improved substrate for development of reef-based communities. The resulting reef could have high and low relief components, crevices, ledges, edges, holes and other features which increase substrate complexity. Addition of such materials would also serve to provide some "replacement or compensation" for the upper water column platform structure which is would be removed to meet navigational, safety or other requirements. The size or footprint of the reef habitat area would also be increased through materials enhancement. A larger reef area could contribute to development of self-sustaining reef populations and serve to limit the "habitat island" effect of a small isolated reef.

Materials should have inherent stability once in place. Those with high specific gravities provide the greatest likelihood that the reef configuration will be stable and remain in place over time. Materials should have a very long or indefinite life in the marine environment. The physical and chemical composition, and shape should not degrade or change such that the substrate/habitat function is substantially impaired. Rock and concrete rubble have been used extensively and perform well for artificial reefs in California. Manufactured substrates have not been used extensively here, but could be appropriate to meet specific reef design criteria. Quarried rock is locally available in any quantity, size and in several densities. Shoreline quarries simplify transport and delivery by barge.

Concrete rubble, or scrap is a material of opportunity with uncertain availability, which may have to be stored while sufficient quantities are accumulated. Shapes and sizes are variable and depend on the source and it may be mixed with other undesirable materials. Transportation involves several stages, overland, loading facility, barge. Manufactured substrates can be developed for a specific reef design and purpose with mass production and replication increasing cost effectiveness. These materials could be manufactured at or near barge loading sites to simplify transport.

In southern California, artificial reefs have only been constructed in nearshore areas at relatively shallow depths, there has not been any experience with reefs placed in depths similar to those of platforms planned for decommissioning. Reef materials interact quickly with the surrounding substrate after placement including localized scouring which stabilizes around some annual or seasonal variation. Other than the localized effects on the surrounding substrates, no large scale effects have been seen on natural sand or sediment movement patterns. These reefs also undergo a process of biological succession or development beginning with simple communities of opportunistic attached organisms and mobile species which are initially attracted to new relief forming substrate. Communities tend to become more complex with time, and reef-dependent mobile species form resident communities. Giant kelp and other algae may develop on reefs in appropriate depths and locations. Many mobile species may also use the reefs for a portion of their life history - spawning, juvenile habitat, feeding - or include the new reef as part of their larger range which might encompass existing nearby reef habitat. Specific patterns of the biological development process may vary with location, depth, surrounding substrate type and frequency of disturbances.

While enhancing platforms is meant to have beneficial effects on reef based biological communities and resource users, several uncertainties are present. Reefs in California have not been constructed in depths likely for platform-based reef sites. Design criteria for enhancement materials may have to be developed for deeper applications. Substrates

in those sites may have different characteristics (softer, more easily disturbed?) and responses to added materials than those at inshore reef sites. The amount and extent of material to be added to platform structures as reef enhancement has not been established. How large should such new reefs be? Is there an optimum mix of high and low relief components? What are the best substrate types and configurations for the species and communities which are likely to develop at specific locations? The rates of biological development on the new reefs may be different than in nearshore applications.

Many of the components of deeper reef communities are very long lived and a "mature" reef may develop very slowly. Will harvesting pressure at these new sites affect the development process? Before serious consideration is given to constructing rig-based reef systems, general design and siting criteria should be developed and applied to each proposed site on a case-by-case basis.

WHAT IS ENHANCEMENT?

- Addition of other reef forming materials
- Increased diversity and complexity of substrate
- Replace “lost” upper water column substrate
- Increase foot print of the reef

TYPES OF ENHANCEMENT MATERIALS

- Quarried rock
- Concrete rubble and scrap
- Manufactured substrates

CRITERIA FOR ENHANCEMENT MATERIALS

- High density and stability
- Longevity and durability
- Substrate value

PERFORMANCE OF REEFS AS POTENTIAL ENHANCEMENT MATERIALS

- Experience in California limited to nearshore waters
- Physical interactions
- Biological development

UNCERTAINTIES OF REEF ENHANCEMENT IN DEEPER WATER APPLICATIONS

- Interactions with local substrate
- Magnitude of enhancement component needed
- Biological development process

CHARACTERISTICS OF SOME MATERIALS

- Quarried rock
- Locally available on order in desired amounts and sizes
- Concrete rubble and scrap
- Uncertain availability, variable size and shape
- Manufactured substrates
- Designed for specific application

EFFECTS OF ENHANCEMENT AS ARTIFICIAL REEFS

- Resources and habitate
- New or expanded reef communities
- Displacement of existing bottom communities
- Uses and activities
- Additional opportunities for reef-related uses
- Local limitations to uses of soft bottom habitats

LONG-TERM SOCIOECONOMIC EFFECTS OF ONSHORE FACILITY DECOMMISSIONING

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ABSTRACT

The potential long-term social and economic effects attributable to the decommissioning of onshore oil and gas processing facilities and sites that support offshore energy development vary with the type of facility. Limited experience with decommissioning in California poses new challenges to federal, state, and local decision makers. The process of decommissioning facilities that support a single offshore field at the cessation of production is fairly straightforward. The long-term consequences of this action are generally negligible or beneficial. The process of decommissioning co-located and co-operated (consolidated) facilities is more complex. The long-term consequences of this action to land use, economic diversity, and government revenues may be quite sizeable. Furthermore, the potential cumulative impact of onshore disposal on landfill capacity needs to be examined as part of the decommissioning process.

INTRODUCTION

The decommissioning of onshore facilities and sites that support offshore energy development in California State submerged lands and the Pacific Outer Continental Shelf is a relatively new phenomena. Depending on the type of onshore facility, decommissioning may have potentially sizeable, long-term cumulative consequences. This paper examines (1) the nature of decommissioning and the potential social and economic impacts, (2) the three types of onshore facilities--private system, location consolidation, and operation consolidation, (3) the likely long- term consequences from the decommissioning of each type, and (4) the components that make up decommissioning policy.

SOCIAL AND ECONOMIC CONSEQUENCES OF DECOMMISSIONING

Most organized human activity generates any number of social and economic consequences. These impacts, which may be adverse or beneficial, encompass a number of areas including aesthetics, noise, infrastructure, land use policies, public finance and economics, and recreation. Furthermore, the magnitude of the impact varies within the context of where the activity takes place and where the effects are realized. Table 1 lists some of the general criteria for assessing social and economic impacts. While each area has unique criteria, for most social impacts when demand exceeds the supply of a service or capacity of the community to provide the service, a adverse or "negative" impact occurs. Furthermore, impacts may be incremental and project-specific, that is, attributable to a specific action or cumulative, the combined effect when the increment is added to past, present, and future actions. As such, the incremental impacts of a single action may seem inconsequential while the cumulative impacts are quite sizeable.

The life cycle of offshore energy projects progress through four phases — exploration, development, production and decommissioning. Social and economic impacts are usually most pronounced during the development phase when offshore and onshore facilities are sited and constructed. The increased level of activity with its attendant increase in employment and expenditures causes both short-term and long-term in-migration of people to the area creating demands for public services. After the production system (e.g., platforms, completions, pipelines, and the onshore processing and transportation facilities) is completed and operating, the breadth and magnitude of in-migration impacts dramatically decline. The social and economic impacts

caused by the onset of decommissioning, during which wells are plugged and production-related facilities close and are dismantled, will vary depending on the extent to which the area is dependent on the oil and gas industry (Scheweithelm and McPhee, 1983, 175).

Table 1. Criteria for the Assessment of Social and Economic Impacts in Onshore Facility Decommissioning. (Area and Criteria for assessment adapted from California Comprehensive Offshore Resource Study, Volume 1. California State Lands Commission, 1994).

Area	Criteria for Assessment	Likely Long-Term Effect
Cultural Resources	1. Effect on prehistoric or historic archeology site. 2. Adversely affect a site or property of cultural significance to a community or ethnic group. 3. Restrict existing uses which are religious or sacred to a recognized group.	None. Most of the impacts result for on-site construction. Dismantling of facilities should avoid areas known or suspected to be culturally significant.
Aesthetic (Visual)	Changes in view of 1. primary travel routes and use areas. 2. a component for which there is a public interest and concern. 3. sensitive or unique natural community 4. on the horizon.	Beneficial from the removal of industrial facilities in primarily non-industrial area. Re-industrialization after decommissioning of consolidated facility could induce new impacts.
Infrastructure	1. Increase level of traffic to degree that it reaches an unacceptable level of service. 2. Substantially reduce available capacity of public water supply, sewage treatment, energy systems, schools, solid waste, toxic waste or public safety personnel and facilities.	Few long-term impacts due to stable low level employment in post-development phases. Re-industrialization after decommissioning of consolidated could induce new impacts. Impact on solid waste disposal capacity is possible.
Land Use	1. Inconsistency with local or state land use policies. 2. Commitment of land, elimination of future land use options.	Beneficial for private system facility. Potentially sizeable for location and processing consolidation.
Public Finance/Economics	Does the action result in: 1. Significant changes in public revenues. 2. Significant changes in public agency expenditures. 3. Changes in local property values. 4. Nonconformance with local land use and coastal programs.	Likely negligible effects for private system facilities. Potentially sizeable for location and processing consolidation depending on value of offshore industry to local economy and tax base and ability of government to replace lost revenue.

The prevalence of social and economic impacts during the development and production phases does not mean that a reduced level of activity during decommissioning is inconsequential. A National Research Council study (1992, 100) recognized that termination requires more and different labor than production. Beyond the short-term impacts, the study recognizes certain long term and cumulative impacts may result from termination, determined largely by "the extent that the economic and social characteristics of regions have been shaped by the petroleum industry." The cause of these impacts will not only be from the cessation of a primary economic activity, but that its disappearance has "also left in its wake conditions that may hinder alternative uses and repel those who might invest in their development." Investment in development of other activity is likely to be hindered, the report posited, because uncertainty will remain about the future of oil and gas resources of an area, which may be resumed under different economic conditions.

Rapid production declines and facility decommissioning in an area highly dependent on the offshore energy industry can have very pronounced social, financial, and organizational impacts and regionally important economic consequences, as seen in the "bust" in the Gulf offshore industry in the 1980s (See Gramling, 1996, 97-118; Seydlitz, *et al.*, 1995; Thayer and Hadley, 1990). For the most part, California communities affected by offshore energy development, which is a much smaller segment of the area's economy than in the Gulf of Mexico, have not experienced the severe economic dislocations induced by the decline of the oil prices in the 1980s. However, the economic impact of offshore energy development on Ventura and Santa Barbara County, as one recent study noted, does provide significant benefits to the area. The study surmises that the cumulative impacts of a gradual decline and cessation of the activity could be sizeable (UCSB Economic Forecast Project, 1997). Moreover, within this area, energy development activities have had different cumulative effects on the two counties and within the counties (Paulsen, *et al.*, 1996; Molotch and Freudenburg, 1996). Social scientists recognize that the limited experience with decommissioning of facilities in the Pacific means that the socioeconomic impacts attributable to this final phase may be the least well understood of all the impacts (SCEI, 1991, B37).

Finally, understanding the impacts of decommissioning are important to the policies which govern the development of offshore energy resources in the future. Decommissioning may be seen as policy termination (SCEI, 1991). The policies that shape offshore energy activity at any given time are a combination of location, technology, economic, and political factors (Lima, 1994), and the effect of these factors will shape decommissioning policy. Offshore energy projects have very long life cycles. Decommissioning occurs within the context of the time and place. The policy that governs activity at the end of one era of development becomes the foundation for policy that will govern the next era of development. Yet, there is not a single "decommissioning policy." Rather, it is an amalgam of the policies of the government agencies at all three levels of government involved in the process.

CLASSIFICATION OF ONSHORE FACILITIES

Different types of onshore facilities may require unique policies for decommissioning of facilities. Using the typology of onshore facilities developed by Willard Price (1987), onshore processing facilities in Ventura and Santa Barbara counties fall into two classes--the private (market) system and the private industrial development. Private system development is characterized by the "maximum private freedom to own land and develop facilities, within traditional local government land use, site development, and building controls." Private industrial development, of which consolidation is a variant, is characterized by "private ownership and development of facilities, involving public industrial development sites, within public plans and environmental regulations."

PRIVATE (MARKET) SYSTEM

The private system onshore facility affords the developer maximum discretion and flexibility in the siting and the sizing of its onshore processing facility and describes the system that was prevalent in Ventura and Santa Barbara counties until the early 1970s.

Facilities were designed and sized for the particular characteristics of the product and the field. Facilities were usually sited as close as possible to the landfall of the offshore-to-onshore pipelines, in order to minimize transportation costs. If several operators developed the same field, each usually had its own processing facility. Shared facilities or the commingling of production from several fields at a single plant was not usually practiced and in some cases was prohibited. These separate onshore sites were relatively close together, reflecting the pattern of offshore leasing, land ownership and the previous oil field development. In combination with existing onshore production, private system development resulted in the industrialization of the coastline as each operator constructed a separate onshore plant. (For a detailed description of energy facility siting in general see New England River Basins Commission, 1976, and in the Santa Barbara Channel in particular see Centaur Associates, 1985 and Lima, 1994). Planning for these facilities was sequential and reactive, with each facility being considered individually when the operator requested initial or subsequent permits (Price, 1987).

PRIVATE SYSTEM DECOMMISSIONING

Under the private system, onshore processing facilities, the processing site, and offshore production components (platforms, subsea completions, slant drilling from an onshore site) are physically and conceptually linked. When the decision is made by the company to terminate operations, decommissioning of the entire seaward and landward components may proceed simultaneously. In essence, the private decision renders the entire production/processing system redundant. (Government policies influence the economic attractiveness of continued production under prevalent market conditions. See, for example, California Oil Survival Team, 1993.) Each level of government is concerned with facilities within its jurisdiction. Private system decommissioning exhibits the least regulatory overlap. All onshore equipment can be removed and the site restored with little concern of the cumulative effect of these actions. Decommissioning is and was very much a case-by-case, facility-by-facility decision. As such, onshore decommissioning activities are primarily concerned with issues proximate to the physical environment--facility removal, clean-up of on-site contaminated areas, site restoration, and revegetation.

Local governments have had limited experience with decommissioning private system onshore facilities. Facilities and sites that supported offshore production have only recently begun to be decommissioned. Formal decommissioning policy for the private system has been very ad-hoc, contained in a collection of land use plans and ordinances and in individual facility permits. Policy is very general, mandating removal and restoration. Details of decommissioning were very site specific and concentrated on the best way to achieve the removal and restoration objectives for each specific site. These detailed procedures are often contained in a regulation-mandated abandonment plan or by some other action by public authorities (SBC, 1990).

This “policy” has generally functioned adequately. However, one Santa Barbara County (1996) publication noted that while the regulatory framework appeared to be functional overall, some potential issues warrant attention. Particularly, variation was found to exist in “due diligence towards timely abandonment of an oil and gas operation, including the removal and restoration of the site”(SBC, 1996). In some cases, the “lag” between cessation of operations to commencement of removal has been unacceptably lengthy to local decision makers and other stakeholders.

Another concern regarding timeliness of action involves how to ensure industry bears the costs of decommissioning rather than the public, which could be exposed to potentially large risk if decommissioning is not accomplished as intended. This latter concern is the reason that permits require performance bonds or some other type of surety.

IMPACTS OF PRIVATE SYSTEM DECOMMISSIONING

Decommissioning occurs in the context of the current time and place. This facet is seen in land use issues which are the primary social and economic impacts of private system decommissioning. Potential impacts include

the compatibility of the decommissioned site with adjacent land uses and ensuring the new land use designation is consistent with state land use policy, such as California Coastal Act policies. Given the long life cycles of energy projects and the changing pattern of land use, the current policies are likely to be much less tolerant of renewed use of the individual sites for processing. For example, the California Coastal Act requires consolidation of onshore energy facilities. In turn, this requirement is part of each county's local coastal land use plan.

The processing facilities that supported the "Mobil pier" state tideland leases were in part authorized by Ventura County via a conditional use permit (CUP) in 1948. When these facilities were recently decommissioned, the CUP required minor modification to address the dismantling of facilities. However, the CUP remained in effect because some facilities covered by the CUP were still in operation (Fugro West Inc., 1996). Underground pipelines were abandoned in place to minimize ground disturbance. Above ground pipelines were either removed or were to remain in place until the entire pipeline corridor which served more than the processing plant was abandoned. Zoning of the parcel remained Coastal Manufacturing, which limited uses of the parcel to petroleum related activity until the zoning designation is changed. The surrounding land use is zoned as coastal open space or industrial, uses that are compatible with petroleum related activities (Francis, 1997). However, since the site is within the area intended for onshore processing, the action is consistent with current policy.

Santa Barbara County chose to change land use designation of private system facilities in advance of decommissioning in part to ensure compliance with Coastal Act-mandated consolidation policies. The decision in 1990 to rezone seven existing onshore sites in the area adjacent to the Santa Barbara Channel was done at a time when many of the sites still supported offshore production. The rezoning action had the effect of rendering offshore energy processing at these sites a "legal non-conforming land use" which allowed the continued existing use that would otherwise not be permitted under the new designation. While non-conforming land uses may be continued, the designation prevents the expansion or enlargement of that use (SBC, 1990). This action will cause future processing to occur at consolidated facilities in accordance with current policy.

The long-term social and economic effects of properly decommissioned onshore private system sites are few. Cultural resource impacts occur during the development phase from construction. Aesthetically, removal of industrial facilities in primarily non-industrial areas is viewed as a benefit, as is the restoration of the site to a land use and zoning designation that is compatible with the surrounding area. The economic consequences of decommissioning are ameliorated by the fact that for many years the facility most likely supported declining production from the associated field and operated with a relatively small and stable workforce. The public finance and service impacts are minimized because when production ceases the property tax value of the physical plant (i.e., improvements to the land) is minimized. In some cases, whatever use replaces the facility, such as conversion of the processing site to a recreational or residential development, may lead to greater assessed valuations in the long term.

PRIVATE INDUSTRIAL DEVELOPMENT (PID)

Under the private industrial development concept, land and facilities are privately owned and developed within the framework of public plans and environmental regulation. An example of the PID is the establishment of consolidated processing sites and facilities in Santa Barbara County in the mid-1980s. Price (1987) notes that consolidation creates an onshore "oil industrial park" and represents a step toward comprehensive, proactive planning away from the sequential and reactionary planning that characterizes private system development. There are two types of consolidation--location consolidation and operational consolidation.

LOCATION CONSOLIDATION

Location consolidation is structured so that separate processing facilities must be co-located in a designated geographic area or within a specific site. That is, land use plans

and ordinances designate the areas where these facilities are to be co-located. This policy attempts to reduce the cumulative impacts of individual facility construction by aggregating the impacts from many sites to a centralized location. However, location consolidation retains many of the characteristics of the private system described above wherein each operator is free to construct and operate facilities within this zone. Often, the extent of the area where facilities will be allowed is determined by the already existing concentration of facilities in an area from previous and current development. The strategy presently used by Ventura County approximates location consolidation.

In Santa Barbara County, location consolidation was a strategy first annunciated in 1967 in order to reduce industrialization of the coastline brought on by the projected number of onshore processing plants that would be needed to support expanded offshore leasing. The policy favored expansion of existing facilities onto lands adjacent to existing sites and consolidation of facilities on existing processing sites or the land adjacent to them as an alternative to new, separate sites (Lima, 1994). This policy marked the transition from the private system to the private industrial system since it controlled within public plans and policies where and under what circumstances that onshore facilities could be sited.

LOCATION DECOMMISSIONING

Location consolidation decommissioning allows removal of facilities but retains the underlying land use designation which allows the continued use of the site for processing. If a single operator chooses to decommission facilities, the action might require removal of equipment and restoration of a portion of the site, but it does not require that the entire site and all facilities be decommissioned. An area may experience a “rolling decommissioning” of facilities over the life of the site. Indeed, the site could experience cycles of industrialization and decommissioning over time. However, the site would always be available to support onshore activities for offshore development. In fact, regulations could make provisions for redundant facilities to be mothballed for a specified period of time to avoid impacts from rebuilding on the site. However, in requiring all onshore facilities to be sited within the zone, location consolidation prevents expanded industrialization into other coastal areas. The challenge to policymakers is to determine how large an area location consolidation needs in order to be successful and translating that area into reality, through land use plans and ordinances.

OPERATION CONSOLIDATION

Operation consolidation is structured so that multiple operators commingle processing at a single facility or prescribed number of facilities at a designated site. In this respect, facilities are not only co-located (location consolidation), they are co-used. The process of siting and designating these sites is more complicated than for a single-operator facility (New England River Basin Commission, 1976).

In Santa Barbara County, when the policy regarding consolidated facilities and sites became fully developed by the mid-1980s, the objectives for this siting strategy went beyond the desire to reduce the number of facilities and locations and the future demand for the same. The objectives of operation consolidation are fairly straightforward. These policies seek to:

- reduce the number of facilities and the number of locations both in the present and in the future (Anthony, *et al.*, 1991);
- reduce or concentrate environmental impacts and reduce cumulative impacts (Callahan, *et al.*, 1987);
- help reduce residual risks to the coastal environment (Douros, *et al.*, 1991);
- provide all potential operators with an opportunity to develop resources by avoiding denial of “future development that has been precluded by projects that have occurred at a pace and manner that prematurely exhausts limited resources” (Callahan, *et al.*, 1987). (Broadly defined, resources includes land for processing sites.)

Consolidation strategies are not necessarily designed to limit offshore development activity by restricting onshore processing, although they could theoretically have that effect. Consolidated sites can be sized to allow room for additional facilities or expansion of existing facilities assuring land resources for future

processing if needed. Encroachment of consolidated sites by incompatible land uses can be minimized if a comprehensive planning process designates land uses for areas adjacent to the consolidated site.

Santa Barbara County policy regarding consolidation requires "new" production, to the extent technically and environmentally feasible, to be (1) processed at consolidated facilities to the maximum extent possible and (2) commingled, that is, production from several operators processed at a single facility, even if throughput has to be reduced proportionately to accommodate new operators. The policies further restrict the construction of additional facilities at consolidated sites in order to eliminate "redundant facilities." The authorized consolidated facility capacity was determined, in part, by considerations of a future potential level of development.

OPERATION CONSOLIDATION DECOMMISSIONING

The process of decommissioning either type of consolidation will be comparatively more complicated than the private system. Similarly, the social and economic impacts from the decommissioning are likely to be more complex. The difference in potential impacts stems from the basic structure of the three. With consolidation, there is a conceptual if not real separation of "onshore" and "offshore" facility decommissioning and a separation of "facility" decommissioning from "site" decommissioning. Furthermore, a number of other considerations arise when comparing location consolidation to operation consolidation decommissioning.

For example, operation consolidation must consider the impact of multiple users. A single operator may decommission offshore structures, ceasing input into the onshore facility. This cessation of an operator's input may increase the marginal costs of the remaining users if they do not increase production to maintain a level of throughput. However, in a multiple-user facility it is unlikely that the loss of any single operator will raise marginal costs of processing to the point that continued production for remaining users becomes economically irrational, especially if the throughput was pro-rationed among the users. As such, decommissioning of offshore structures need not be causally linked to decommissioning of onshore structures. However, if the facility depends on the throughput of one dominant operator, decisions regarding decommissioning may indeed affect the future viability of continued use by the remaining operators.

The number of stakeholders potentially involved in consolidation complicates decommissioning decisions. The expectations of facility and site owners, the facility operator and the facility users (all of whom may be different) as well as the desires of different levels of government and the public must be taken into account when making decisions about the decommissioning of facilities and onshore sites. One of the long-term public policy questions for operation consolidation is "what is sufficient onshore processing capacity for current and future production?" With location consolidation the question becomes one of "what is the sufficient onshore area for current and future production?" Given the uncertainties involved in energy development the answer to the questions may be somewhat problematic.

LONG-TERM SOCIAL AND ECONOMIC CONSEQUENCES OF CONSOLIDATED DECOMMISSIONING

The answer to the questions considered in decommissioning will be very important since it has the potential to affect the future economic diversity of an area. Onshore infrastructure imparts a economic and regulatory bias to the area in favor of additional development. The availability of infrastructure is a factor in a firm's decision to undertake new or expand existing operations in an area (Lima, 1994). Decommissioning expenditures have very little impact on future economy, that is, employment created by facility removal and restoration is a short-term benefit. Once the tasks are completed the economic benefits of increased employment cease. However, expenditures for maintaining capital infrastructure, such as consolidated facilities, provide a means of continued tax revenue, employment, and other potential economic gains. The attractiveness of maintaining this infrastructure is a decision that is made in the light of several factors,

including compatibility of offshore activity with other values and competing and possibly incompatible uses.

In an area where operation consolidation is in effect, careful thought must be given to the consequences of closure and dismantling of a consolidated facility prematurely--prior to the exhaustion of possible production in the area. This action may make follow-on production uneconomic if the remaining producers are unwilling to assume operation of an existing facility or undertake construction of a replacement facility. If construction of a replacement facility is undertaken, the area will experience some measure of social and economic impacts with the attendant increased demand for public services and infrastructure that characterize the development phase of offshore energy projects. In addition, the decision to decommission facilities and sites must be consistent with state coastal policies which seek to minimizing industrialization of the coastline.

If the purpose of operation consolidation was to achieve the objectives listed above, the success or failure policy must be evaluated in light of the extent that impacts from the re-industrialization of the area are prevented, avoided, or minimized. As such, facility decommissioning and retention of the consolidated site must be considered as an alternative. Conversely, premature decommissioning may hasten the end of extractive industry in the area in favor of other non-extractive uses. To the extent that these other uses can replace the contribution of energy activity and not cause greater cumulative development impacts, these may prove more valuable than continued encouragement of the offshore industry.

Premature cessation of production could have sizeable impacts on government revenues as valuable infrastructure is suddenly removed from the property tax base of a community. However, the local government revenue from offshore energy is more than just the sum of property and sales tax revenues and fees charged the operating companies. In Santa Barbara County, for example, approximately 9.7 million dollars has been provided to the Coastal Resources Enhancement Fund (CREF) since 1987 by various offshore energy projects. These contributions represent an offset of residual coastal recreation, aesthetic, tourism and other impacts caused by offshore energy development that could not be mitigated using other strategies (McNeal-Pfeifer, 1997). In the decade since its inception, the fund has provided monies to local public and not-for-profit organizations for a variety of activities including coastal land acquisition, infrastructure capital and operating improvements and recreation programs. In some cases, The CREF fund provided the matching funds needed to “leverage” greater amounts. Whether or not these programs would have been or could have been funded in the absence of energy development is speculative. But, even a cursory examination of the projects funded through CREF reveals an improvement in the local quality of life that arguably may not have occurred in the absence of these offset funds. Furthermore, the synergistic effects of the “seed money” that CREF expenditures provided has not been thoroughly examined. When analyzing the long-term consequences of facility decommissioning, the value of the offshore industry must be made in light of the contributions and consequences of that activity and the impact it has on public finance and infrastructure.

The long-term effect of decommissioning may also be realized in government operations. The fundamental structure and practices of local government has had to change to accommodate offshore energy development (Lima and Woolley, 1990, 1991; Lima, 1994, 1995). Since location and operation consolidation are mandated by public policies, it stands to reason that decommissioning of these facilities will create new administrative challenges and there will be greater government involvement in the decommissioning. Also, since consolidation is essentially a government industrial development policy it is likely that more stakeholders will seek to have their concerns addressed through public administrative and political forums.

THE DISPOSAL ISSUE

Experience with the deconstruction of facilities and disposal of the non-salvageable material in landfills has not indicated an impact to public services and infrastructure. However, there

may be cumulative effects from the onshore disposal of materials in light of existing landfill capacity. Whether or not onshore disposal constituted a substantial long-term effect would depend on the amount of material requiring disposal in a landfill and the impact that the disposal has on the remaining capacity of landfills. California has mandated that local governments reduce the amount of material deposited in landfills, but the potential contribution of decommissioning to the waste stream remains to be estimated.

Dismantling of the Mobil pier onshore processing facilities in Ventura County was projected to result in up to 60 truck trips, half to remove debris and scrap from the site and half to remove used and surplus material (Fugro-West, Inc., 1996). Local landfills capacity was adequate to handle the debris. Similarly, when the so-called "4-H" platforms (Hazel, Hope, Hilda, and Heidi) were recently decommissioned approximately 11,000 tons of steel were brought to shore at San Pedro, California, and sold as scrap for approximately 330,000 dollars. However, ultimate onshore disposal costs exceeded salvage revenue by approximately one million dollars. The contractor had to handle and dispose of 3,000 tons of marine growth, 1,000 tons of cement, and 300 tons of mud at an approximate cost of 850 thousand dollars, 275 thousand dollars, 275 thousand dollars, respectively (Bafalon, 1997). The California State Lands Commission (SLC, 1993) noted that disposal could constitute the "critical environmental issue." Disposal impacts are a factor of how much material has to be processed, length of time needed to break up and dispose of the facilities, the location of the disposal activity, and whether the disposed elements contained toxic materials.

The subsequent environmental assessment for the removal projected noted no short- or long-term effects from disposal (SLC, 1994).

CONCLUSION: FRAMEWORK FOR ONSHORE FACILITY DECOMMISSIONING POLICY

Limited experience with decommissioning presents new challenges to decision makers. Presently, clear policy direction does not exist regarding the decommissioning of onshore sites. While it is beyond the scope of this paper to suggest a model policy, a framework for addressing decommissioning should, at a minimum, address the following items:

1. The point at which facility decommissioning is triggered (i.e., cessation of current production, cessation of anticipated production, decline of throughput below a specified threshold).
2. The process to be followed to initiate decommissioning, including provisions for stakeholder input.
3. The mandatory and alternative actions for decommissioned facilities and sites (e.g., complete removal and restoration, remediation of contamination, partial removal of unused equipment, temporary suspension in anticipation of future need, rezoning of land, abandoning pipelines in place, etc.).
4. The time frame in which on-site decommissioning actions must be completed.
5. Provisions to ensure financial resources are available to complete decommissioning.
6. The requirement for site-specific approval of actions (e.g., a decommission plan for each facility and site).
7. A process for considering of the long-term cumulative effects of decommissioning and strategies to reduce these effects.

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SUMMARY AND RECOMMENDATIONS

TECHNICAL SESSION: SUMMARY AND RECOMMENDATIONS

MARINA VOSKANIAN and DR. ROBERT BYRD
Session Co-Chairs

Russ Schmitt: Now we will hear from Marina Voskanian. Marina will give an overview of the technical sessions work group report.

Marina Voskanian: Thank you Russ. Good Morning ladies and gentleman. I am so pleased to see such an overwhelming interest for this workshop over the last two days. We had a technical program with several people contributing to that session. I would like to thank every one of them. Thank you to the League of Women Voters, they had a great input in our session. We heard from Surfriders, the County of Santa Barbara. Of course the members from SLC and MMS, Department of Conservation, Division of Oil and Gas, American Pacific Marine, Twachtman, Snyder and Byrd who had a great role in organizing this session, Frugal and others.

During our technical session that was conducted Tuesday afternoon we received different options available and type of technology generally used to accomplish the decommissioning and removal of offshore facilities in environmentally safe and efficient manner. This session as you saw was oriented toward informing the public and non-technical personal on plugging the wells, the commissioning of topside, production equipment and debris jackets, pipelines and cables. The site clearings and verification, and onshore facilities clean up and removal were also discussed. There were two to three issues that arose during that technical session and I would like to invite my co-chairman Bob Byrd to address those issues. Thank you.

Bob Byrd: There were at least two issues and probably others, but there were two that jumped out at us, that we felt deserved some comment. The issue of structural longevity, or rather the prospect of leaving decommissioned structures in place was discussed on several occasions during the last day or so. We felt we needed to comment about the requirements for leaving a structure in place. In particular the maintenance requirements of these structures. Offshore platforms are relatively high maintenance issues in terms of maintaining their structural integrity. Many of the platforms offshore California have impressed current cathodic protection systems which prevent corrosion and deterioration of the structural steel. Something to replace this would likely be required if the topside were removed and electrical power generation or attached power cables from other facilities were removed. There are possibilities of other passive forms of cathodic protection, but without some cathodic protection these platforms would deteriorate very rapidly. This issue needs to be considered in leaving these platforms in place.

The other comment that we want to make is that there is a fair amount of anecdotal evidence that structures which are submerged well below the splash zone or free surface would have a very long life. There are a number of places in the world where you can see ships that have existed for fifty to one hundred years and are still in relatively good condition. The offshore platforms which you are looking at out here have much heavier steel than a ship's so I think you can make a pretty strong argument that they would be around for a long time provided there was no contact with the air-water interface.

The other issue we want to comment about is that of the possibility of refloating jackets. We had made some comments responding to questions from the audience that it would be very difficult using conventional means to pick up one of the large structures here, move it into either a shallow water site or a deep water disposal site. Technically that is a very difficult thing to accomplish. Afterwards Bill Griffin reminded me of a presentation we both saw this last spring at Aberdeen at a decommissioning conference related to development of external buoyancy packages which can be attached to platforms. While this is something that is in an early state of

development, it turns out after putting a few numbers on paper that in fact it does appear that it is something that may be feasible with more development. This type of removal technique would have a very significant impact on the options available for the disposition of jackets. It would affect the feasibility of deep water disposal. It would affect the feasibility of shallow water reefing of an entire jacket. It would affect the feasibility of removing a jacket as a single unit to a distant disposal site of whatever type you choose.

Finally we were approached this morning with the comment that we really do not give a great deal of consideration in the technical session to the reuse of facilities offshore California. I think that is a fair comment. In looking at the prospect of reusing of the California facilities, it is a little problematic for us to generate a lot of enthusiasm for the possibility of reusing the facilities in a context of an environment where there is not a lot of ongoing development. If you look at the Gulf of Mexico market platform, jacket and facility reuse has gotten to be very popular. Probably 25% of the jackets or facilities historically have been reused. Today's market with increased activity that percentage is probably increasing. In the context of California decommissioning what is likely to happen would be that individual components from facilities would be reused. For example generators, production modules, or perhaps quarters packages. Today it would be likely that these would be reused in distant markets, perhaps in Southeast Asia, South America, or other areas. It seems unlikely that today there would be a great deal of opportunity to reuse these facilities in California. Although that situation may change. Thank you.

TECHNOLOGICAL SESSION SUMMARY & ISSUES

1. Session Summary:

The technical sessions reviewed options available and the type of technology generally used to accomplish the decommissioning and removal of offshore facilities in an environmentally safe and efficient manner. This session was oriented toward informing the public and non-technical personnel in general on the decommissioning process. Emphasis was on explaining the various steps and the options available. Specific areas covered in the session were: plugging of wells and the cleanup and disposal of production equipment, related structures, pipelines and cables. Offshore site clearance and verification and onshore facility cleanup and removal were also discussed.

2. From this session's questions and the general discussion during the workshop, the following issues deserve comment from a technical perspective:

- **Structure Longevity**

  Structures left above the water line will require significant and continuous maintenance to insure their long term survival. The air/water interface creates a galvanic cell which accelerates corrosion unless cathodic protection is provided. Many California platforms have impressed current cathodic protection systems which require electrical power to operate. This would not be easy to provide on decommissioned platforms. Passive cathodic protection systems, which are found on some structures, generally have a life of approximately twenty years. These systems would require anode replacement on a continuing basis to survive, along with maintenance painting of exposed surfaces.

  There is significant evidence that steel structures submerged well below the splash zone (water surface) would have very long life. Steel ship hulls have been found in relatively good condition after nearly one hundred years submergence. Offshore platforms have much thicker steel plate in their structures than do ships.

- **Jacket Removal**

  There is ongoing development related to external buoyancy systems which may make it feasible to re-float jackets in a single piece. This will have significant impact on the options available for jacket disposal, such as deep water disposal, shallow water reefing and towing to distant disposal sites. It is reasonable to assume that this technology will be developed in the near future as the demand for its application dictates.

- **Facility Reuse**

  Questions concerning the feasibility of reusing all or part of offshore facilities in other oil and gas industry applications arose in discussions. This issue was not addressed in any significant detail during the session, primarily due to time limitations. In closing we wish to make the following observations concerning this subject:

1. While reuse of oil and gas processing facilities is becoming very popular in some areas such as the Gulf of Mexico, it seems unlikely that there will be an opportunity to do much of this offshore California because of the limited amount of new development that is anticipated. Processing equipment that is brought to shore will be screened and the most valuable items will be transported to other areas for reuse. The remainder will be scrapped.

2. Complete process modules may be used in some cases where it is practical to remove them intact and transport them to the new application area for refurbishment and reinstallation.

3. In general it will not be feasible to reuse jacket structures because of the difficulty in picking them up and transporting them to a new site for reinstallation. However, new technology may make it possible to do this in specific cases if new developments occur offshore California where the transport distance is not great and the water depth is similar.

4. New technology may make it feasible in the future to remove an entire topsides (processing equipment and supporting structure) and transport it in a single piece to a new site. This has recently been demonstrated with a 1200 ton offshore facility topsides in the Gulf of Mexico. Most of the topsides offshore California are considerably larger than that, but the new technology is promising.

ENVIRONMENTAL SESSION: SUMMARY AND RECOMMENDATIONS

SIMON POULTER and BILL DOUROS
Session Co-Chairs

Russ Schmitt: Now it is time for the Douros and Simon show. They will be talking about the environmental workgroup session and report.

Simon Poulter: Thank you. I would also like to just briefly thank everybody who participated in planning and participated in our session. There were a number of meetings that were held over almost a year period of time to pull together the panel as well as the user groups that expressed their insight on various technical issues. We have sat down and spent a lot of time and I really want to appreciate everyone that has participated in that process. I also found the experience that Bill and I had yesterday I think has been repeated throughout the conference. We were actually a little disappointed after our session that the questions seemed to jump to the afternoon session. A great deal of the comments were made in regard to that. We felt that we were not getting a lot of feedback. Bill and I stepped off to the side after the last session and were hoping to spend fifteen minutes summarizing the result of our session. We promptly got into a huge argument with each other about what the conclusions were really going to be. We realized that the session had touched on many of the issues that had been raised in previous environmental documents and reviews of works. I don't want to say that we got into a knock down drag out, but I think it was a very valuable experience. I know that I have had a number of conversations with other individuals during this conference about particulars on other individual's projects. I think that is the value of the session. It is that we have been able to touch on those issues.

The second kind of observation that has been made is that the communication has been very positive. We have seen in most of the sessions groups that don't talk to each other sit side by side after making some comments about each other. I think that is a very valuable experience. We really saw that as a positive exchange of open ideas and will hopefully continue that dialogue after the session.

Going into it briefly, the overview of the discussions made by our speakers we summarized here in bullet format. I will touch briefly on some of the comments because some of you cannot see the overhead from the back. Peter Cantle discussed air quality. I think his major message was that air quality is a major changing issue for any decommissioning project, and that we are continuing to see a lot of dialogue going on among the state and federal agencies regarding what will be required for decommissioning projects and that the fact that the seasonal issues of ozone are going to have an impact on some of the larger projects that we see in the future. He concluded that fewer activities proposing to leave parts of the jacket in place will result in less emissions, but that was kind of a given in many of our discussions. I think less physical activity, less potential impacts. That does not address the potential disposition issues obviously and that was touched on. Commercial and recreational fishing preclusion is obviously the biggest issue in that regard and recognizing there are going to be seasonal constraints once operations occur, particularly if there are larger derrick barges that were going to go into that. Fisheries research indicates that there are effective methods to reduce potential impacts to fisheries resources during abandonment. We do recognize that there is some impact from especially explosive uses, but those uses have been identified as being less significant when you consider the overall commercial fisheries catches in both the Gulf and I think can be extrapolated out to the California coast.

Peter Howorth in discussing marine mammals identified that there are very effective mitigation measures in place that have been implemented on a number of projects that have resulted in effective reduction of impacts to marine mammals.

Bill Douros: As Simon mentioned, while it seemed that we were not in agreement on some aspects of all of the presentations when we met last night to talk about what we were going to summarize, that is the first disagreement we have had in our eight month relationship. What is often an air quality mitigation measure to prevent ozone is to schedule the project during seasons when you are less likely to, through the natural processes of the sun and temperature generate ozone by the emissions that occur. That means you do as much of the work you can in the winter time. The winter time is when gray whales migrate and so you can obviously see that there is immediately a conflict with two very important issues to abandonment. This is something that has come up on the construction end of the projects, and this is something that is going to come up on the major abandonment projects too. We are talking about a lot of emissions, a lot of facilities in an area that is very important to marine mammal migration routes, especially in the winter time. This is an issue that needs to be resolved as time goes on.

Simon Poulter: Ray deWit presented an overview of marine benthic organisms. In reference to Ray's talk, our conclusion was there was a short term loss of habitat when you remove a structure. Then the question was raised, is that significant? Is that going to result in a long-term loss of habitat for these organisms? I think there were still some questions in our minds at the end of his presentation that we could not resolve and I would be interested to hear how others interpreted some of the statements he made. The issue was that you will initially lose that habitat, the hard substrate that many individuals have indicated is a limited resource in the Santa Barbara Channel in particular, but that natural recovery will occur. Well how fast will it occur? Is that going to be a natural succession? Will it be the same species? All of those issues still are out there. We have seen in some of the flow line abandonments in particular that issues have been raised and are still being debated among the agencies.

Water quality, Pete Raimondi gave a very interesting presentation and I guess I was a little lulled by the second slide. This slide said less than significant and I wrote it off. That was one of our bigger discussions because the rest of his presentation presented an overview of the potential issues that we need to consider. That we, well, don't see anything under certain parameters, but if we look at other parameters that we are maybe not looking at, such as biological communities there may be an impact, but we do not know. So....The warning went up. I admit I missed it.

Frank DeMarco got into clean up standards of onshore facilities. A new issue that has been raised is that an applicant does have the ability to identify a lead agency. In my brief presentation I showed you in a slide that there are potentially a lot of lead agencies issues regarding a project that has OCS state waters and onshore components that can result in significant problems. Future land use issues are going to drive risk-based assessment on whether we are going to remediate a site immediately and result in some excessive excavating of a site or bioremediation project. That may result in secondary impacts for future use.

Our last speaker I think brought up some very key issues tied back to that cleanup issue. Kim Schizas talked about future uses of the sites. In Santa Barbara County and south county you have two consolidated sites that have the potential of having multiple operators. We are seeing proposals for potentially shutting down one of those facilities. That may result in a need to look at whether it is appropriate to "moth ball" that facility and wait for the next operator to come in , or remove portions of it. Those issues do need to look at future land uses of do we restore a site to a natural condition, revegetate it? We also have to recognize that a lot of these facilities are located in areas which are very attractive for future development. The Arco Dos Pueblos golf course is such a situation where we are taking an oil field and moving it directly into a recreational facility instead of maybe back to a natural condition. Now I will turn it over to Bill to go into our recommendations.

Bill Douros: One thing I would like to point out before we move on is from the comments made by the ocean users groups. The folks who gave five minute presentations at the end. We would like to summarize that there are obviously competing uses and perspectives on whether or not there are environmental

impacts and the magnitude of the environmental impacts from the act of doing decommissioning. There was an interesting point brought up on air quality. On a recent project they finally had resolved through litigation the mitigation that was necessary. Rules changed after that through new legislation and it added a perspective for me that I had not quite seized prior to this presentation. The one common theme from all of them was communicate! I think all of the speakers mentioned that as something that is absolutely essential. One other point too was that, as I mentioned in the opening remarks on the first day, we try to present to you issue areas for environmental impacts that will result when you do a decommissioning project. That does not mean though that there are not other environmental impacts that typically result. Most of the environmental impact reports when these projects were built included perhaps no more than a page in the 300 to 400 pages of the environmental analysis that said the impacts for abandonments and decommissioning will be roughly the same as the impacts for construction. One of the issue areas that comes up often during construction is the change in the visual and aesthetic characteristics of typically a rural coastline, impacts to recreation and enjoyment of recreation, tourism opportunities, because of that perceived industrialization. While that will occur during abandonment and decommissioning, part of our view as to why we did not want to present that necessarily, it is often too difficult to quantify. An oil rig to some looks like many positive things and to others looks like many negative things. Decommissioning projects may look bad to those that like platforms and good to those who do not like platforms and it is very difficult to try and quantify. That is why we stayed away from it in this presentation/workshop. We wanted to make sure that people did not loose sight of the fact that those are still issues.

Okay, the recommendations then. There are at least five things that jumped out at us as either research tasks or think pieces. The first is regarding air quality. What are the offsets and other mitigation measures that might be viable as mitigation to air emission particularly if the legislation has changed that makes a certain class unacceptable. Secondly, and this is what Simon touched on, what is the effectiveness and rate of natural recovery for marine benthic impacts? You certainly lose habitat. You have an impact to those organisms that grow on a platform when you take it out, but what does that matter? Is it 1/10th of 1% or 10% of an available habitat in an area? Also is it going to recover naturally? Anthropogenic restoration in 600 feet of water is, I am sure, more difficult then even getting the structure out in the first place. So a lot of the mitigation, the recovery of those impacts, is probably going to have to be natural. We need to know if that is really something that is effective and how fast can that come about.

This concept in water quality impacts that Pete Raimondi talked about, informed intuition. I think most people that study these sorts of things might agree, geez....ya know... a barrel of oil spilled during a clean up is kind of hard to consider that a significant impact to marine water quality. An interesting aspect of Pete Raimondi's talk was that for another project where they thought they were measuring the right physical characteristics they concluded that no significant impact would have occurred at ten meters when really there might have been an effect 1000 meters away. So there may be some additional assessment whether it is research or thinking that needs to be done there.

The fourth one did not necessarily come up in our presentation but became obvious when the fish folks talked in the afternoon. What happens to the fish when you take the platform away? Do they go back and populate existing reefs? Do they all get caught by fisherman? Do they all get eaten by sea lions? What happens to them?

Lastly the planning for the future land use for onshore facilities ought to start right away. That is based on what Kim Schizas had to talk about. Jim Lima, I think, emphasized that a bit in the afternoon, too.

The second recommendation is that existing mitigation measures that we know work ought to be required. There are a number of those for marine mammal impacts for instance. Yet we should continue to work to

improve those that we know work and those that we know do not work as well as we like too. There is always room for continuous improvement.

Lastly we recommend that when environmental impact reports for new development are prepared, should that ever come about in the future. Those environmental impact reports need to do a better job of evaluating the impacts of abandonment and decommissioning. Another question is how long are these facilities going to be out there? No one envisioned the Point Arguello project would be taken out within ten to eleven years, but that may be an important aspect of the decision-making in the future.

I think what we are also getting at here, is that when you write an EIR that is 400 pages long about the impacts of constructing and operating a project a couple of paragraphs that just sort of summarize that the impacts will be roughly the same probably is not doing justice to it, particularly when there are some technical limitations to even how you take some of these facilities out. We are seeing that now and that is twenty-twenty hindsight. Anything else to add?

Simon Poulter: I just want to point out that I am sorry we drifted into the disposition, but you all did so we had too. I think the question of what happens to the fish and the impacts associated with the construction of the facility does have to recognize that if we are talking about a structure becoming a reef now, not only do the engineers need to consider that structure in their design, but also we have to recognize that it may have a potential long-term beneficial impact if it is properly designed and sited for that purpose. That concludes for us. Thank you.

SESSION REPORT

Major Observations

1. Comments and questions from audience focused on disposition issues and it is hard to make conclusions with so little feed back. Observations and conclusions based on the speakers are provided below.

2. Open communications were emphasized by the speakers, user groups and public.

Speakers

Air Quality - Peter Cantle

- Air Regulations are continuing to change. Such changes will affect future projects.
- Fewer physical activities means fewer emissions and therefore less impacts.
- How to mitigate air emissions impacts is unclear.
- Seasonally scheduling (avoid Ozone period) may push project schedules when you factor in biological seasons (i.e., gray whale migration).

Commercial and Recreational Fisheries - Craig Fusaro

- Removal activities result in preclusion for both commercial and recreational fishing operations.
- Less removal activity means less impact.

Fisheries Research - Villere Reggio

- Explosives use does result in fish kills. In the Gulf of Mexico this represents less than 1% of the total commercial fish catch annually.

Marine Mammals - Peter Howorth

- Existing mitigation measures have been tested during actual projects and have been shown to effectively minimize impacts to marine mammals.

Marine Benthic Organism - Ray de Wit

- Removal of structures will result in short-term loss of habitat and associated organisms.
- Less removal will result in less impacts.
- Upper 200 feet are most productive.
- Natural recovery timeframe is not clear.

Water Quality - Peter Raimondi

- Impacts are less than significant if they follow established procedures.
- Results are based on literature and observations but not on field verification.
- Caution in his message.

Cleanup Standards - Frank DeMarco

- Applicant can pick lead agency for cleanup levels (not CEQA).
- Risk based clean up levels - tied to future land uses.
- No standard clean up levels have been established (case by case).
- Secondary impacts must be considered for cleanup activities.

Future Land Use - Kim Schizas

- Questions must be asked
  - ⇒ Can the site still be used by other operators (Consolidated sites need more review)?
  - ⇒ Is restoration/recontouring environmentally preferred?
  - ⇒ If not, what is the best reuse for the site?
- We must start planning now.

RECOMMENDATIONS

1. New research or "Think pieces" may be needed:
   a. What are offsets or other mitigation for air emissions?
   b. What is the effectiveness and rate of natural recovery for marine benthic impacts?
   c. Is the "Informed Intuition" that decommissioning causes no significant marine water quality impacts accurate?
   d. What is the fate of fish that lived at the platform once it is removed?
   e. Planning for future land use (onshore) needs to begin immediately.

2. Existing mitigation measures that we know work must be required; continuous improvement for all mitigation must be sought.

3. Environmental Impact Reports for new development must do a better job of evaluating impacts of decommissioning, including assessing what is the "life of the project."

DISPOSITION SESSION: SUMMARY AND RECOMMENDATIONS

DR. MARK CARR and DR. JOHN STEPHENS
Session Co-Chairs

Russ Schmitt: The last workgroup session was on disposition and Mark Carr will give the summary report from that session.

Mark Carr: Thanks Russ. There were many issues raised during the disposition session thanks to the excellent and greatly appreciated participation by a wide breadth of both stakeholders and agencies. We have tried to summarize these issues in the form of recommendations listed here on the overhead. If we have omitted any issues of particular concern please bring them up during the public response period. There were so many issues raised it was very likely we may have omitted some issues that some stakeholders are particularly concerned about.

The first one of these which in the past continued to rear its ugly head is the liability issue. Given that issue our first recommendation is to please try and resolve this liability issue. Critical to that is understanding or determining who is going to be responsible for these structures once they are decommissioned at sea. This is particularly complex off the coast of California because decommissioning is highly likely in either federal or state waters. Depending on where that decommissioning operation takes place may influence who will be liable for those structures. Important to the liability issue is identifying the risks that one might be liable for, and so a risk assessment would be very useful. That risk assessment needs to take into consideration all the various decommissioning options that have been identified during the workshop.

The second issue is to determine or at least clarify the lead agency in the disposition process at both the federal and state level. And to recommend further that this lead agency take a pro-active role in establishing a framework for this disposition process, rather than waiting for a request for a permit before a framework is established. Particularly important is to define the objective of the decommissioned structure. For example whether it is going to be a fishing reef, a harvest refuge, a mariculture facility for fisheries enhancement in general. Clarification of these objectives will probably involve further development of the artificial reef programs both at the state and federal levels. That will determine the role of these structures in a state or federal wide artificial reef program. All of this is to hopefully avoid this idea of materials of opportunity wagging the tail at the disposition process. There is concern expressed that you do not decommission a structure simply because it is there, but so that it fulfills a particular predetermined objective such as fisheries enhancement. Another issue that kept coming up and was addressed by some individuals, but I think there is still some question. Is there a window or is there an option for deep water disposal of these structures?

The forth issue, and from a scientific and fisheries prospective....one future and critical research objective is to collect more information on the comparative performance of organisms of the platforms and on the natural reefs. This is particularly important to the fisheries enhancement objective which was frequently raised. Milton and I presented scientific information, but I hope we did not give anyone the impression that we know all the scientific answers to decommissioning options. Particularly important is understanding how well animals do on these artificial structures relative to how they do elsewhere in natural habitat.

The fifth issue is to investigate the ecological role of these shell mounds. Shell mounds continue to be a contentious issue in this process. We need to understand the dynamics and persistence of the habitat itself, the physical structure of these

mounds. How that will change in an absence of a continued fall of litter from the structure above? And also again to assess the performance of the biota on these mounds with a comparative regional approach. How well do these things do in these habitats relative to other habitats?

If these structures are to be decommissioned at sea certainly it was recommended and the scientific evidence supports the concern that they be done by a case by case process. The regional variability in environmental conditions and biotic communities suggests that each of these structures may play a very different role depending on the organisms associated with them and the surrounding environment. That suggests we cannot generalize any particular strategy for all the structures off the California coast, but rather we need to take those regional details into consideration.

It was also recommended, I think this was an excellent recommendation by the president of Get Oil Out, that we consider an experimental approach to this disposition process. As a scientist I think I have a different definition of "experimental" than most people in this room. I think an accurate way to consider this is as an adaptive management strategy. In other words let's not make the mistake that has been made in the past with other artificial reef programs and just put these things out. Let's learn something as we do it. As we put these things out let's do so in a manipulative manner. So we learn about the role of these structures as we do it. That needs to be designed well ahead of the artificial reef process. This would require a comparative regional approach and evaluation. I cannot stress the role of evaluation anymore! You simply do not conduct some kind of management strategy without assessing or evaluating the success or consequence of that strategy. If we are going to get involved in decommissioning let's make sure we incorporate a process for evaluating the effects of that process.

In the process of decommissioning a series of steps could be considered. First consider the likelihood of that structure meeting the predetermined objective where it currently stands. Will it meet the predetermined objective and if not can that objective be met with some kind of augmentation of that habitat? Dave Parker spent quite a bit of time explaining what kind of augmentation mechanisms might be involved. If it cannot in place or with augmentation meet a given predetermined objective, can it be met elsewhere? If so then let's think about what we need to know in order to place these artificial reefs in a different environment or at a different location. Several stakeholder heads suggested that if these things are going to be left in place please leave the entire structure including some topsides in place. I think that needs to be considered more, and if not can they be buoyed to prevent commercial trawlers from hanging up on these things.

The seventh issue or recommendation is to identify those stakeholders that are impaired by each one of these options and for each case, and to consider collectively with the stakeholders, with the public, and among the agencies how we can compensate for those negative impacts.

The eighth issue is to decommission onshore facilities simultaneously. If it cannot be simultaneously at least do it in a timely manner so we do not have this lag response of decommissioning or restoring onshore facilities as we have seen in the past.

The final recommendation is greater cooperation between industry and research. I think all of us were impressed by Bill Griffin's presentation for the global importance of the activities that occur on our coast. We often heard frequently the importance of science-based decisions. If the global industry wants to further explore the concept of disposition at sea they need to impress upon the local industry the importance of this cooperation between researchers and industry in order to enhance the likelihood of science-based decisions. Having said that I should mention though in my own experience particularly with the companies we have worked with, Pacific Offshore Operators, Torch, and Unocal we have received outstanding cooperation. However I think that this needs to be impressed upon the local oil community as well. Thank you.

DISPOSITION SESSION
ISSUES & RECOMMENDATIONS

- **Resolve liability issue**
  - who is responsible for structures decommissioned at sea?
  - State vs. Federal waters.
  - risk assessment (by option).

- **Determine lead agency at both Federal and State level**

- **Define objective of a decommissioned structure(s)**
  - e.g., fishing reef, harvest refuge, mariculture facility.
  - artificial reef program development at state and federal level.
  - avoid "materials of opportunity" wagging tail.
  - is deepwater disposal a viable option?

- **Collect more information on comparative performance of organisms on platforms and natural reefs (putative fisheries enhancement objective)**

- **Investigate ecological role of shell mounds**
  - dynamics and persistence of habitat characteristics.
  - assess performance of biota with comparative regional approach.

- **If decommissioned at sea…**
  - Case-by-case.
  - "Experimental" approach (Adaptive Management), i.e., LEARN as you DO.
  - comparative regional approach and evaluation.
  - consider likelihood of meeting objective in place.
  - can objective be met with augmentation?
  - is objective best met elsewhere?
  Can entire structure (including some topside) remain?
  If not, buoy?

- **Identify those stakeholders impaired by each case**
  Collectively consider how to compensate for negative impacts.

- **Decommission onshore facilities simultaneously or timely**

- **Greater cooperation between industry and research**
  Industry needs to "think globally, act locally."

AGENCY PANEL DISCUSSION

AGENCY PANEL DISCUSSION TRANSCRIPT

This text was transcribed from audio tapes of the workshop. There are a few gaps in the transcript corresponding to times when the tapes ran out and new ones were inserted.

Russ Schmitt: Good Morning. Today we are going to begin with a summary of the session co-chairs' discussion yesterday. We will then turn to a panel discussion with representatives from federal, state, and local agencies. To begin the discussion agency representatives will start with a five minute reaction of what they have heard, both from the presentation of session chairs, as well as the rest of the meeting. This in turn will hopefully frame a discussion from the audience.

Agency Representatives:
Federal Agency Representatives

- **Richard Schubel**, Chief, Regulatory Functions Branch, U.S. Army Corps of Engineers, Los Angeles District
- **Dr. Lisle Reed**, Regional Director, Minerals Management Service, Pacific OCS Region
- **Maureen Walker**, Deputy Director, Office of Ocean Affairs, U.S. Department of State

State Agency Representatives

- **Susan Hansch**, Deputy Director, Energy & Ocean Resource Unit, California Coastal Commission
- **Bob Hight**, Executive Officer, California State Lands Commission
- **Brian Baird**, Ocean Program Manager, California Resources Agency
- **Peter Bontadelli**, Administrator, Oil Spill Prevention and Response Office, California Dept. of Fish and Game

Local Agency Representatives

- **John Patton**, Director, Santa Barbara County, Dept. of Planning and Development
- **Nancy Settle**, Manager, Regional Programs Section, Ventura County, Planning Division, Resources Management Agency

Russ Schmitt: At this point I would like to ask each of the agencies to give a short reaction to the material they have heard, the recommendations, and the summary of the workgroup sessions. We will start with the federal agency representatives and in particular Dr. Lisle Reed, the Regional Director of the Minerals Management Service of the Pacific OCS Region.

Lisle Reed: Thanks Russ. I would first of all like to say thanks to all the presenters. I was really impressed with the amount of information and the issues. I am always astounded by these workshops because the longer I sit there, and the more I hear, the more I realize how much I do not know. I feel that even by today we have only had chapter one. We have a lot more work to do, a lot more things to find out, and a lot more evaluation work ahead of us. I appreciate also that the speakers who have presented issues over the past couple of days have been very brief. We had to get a lot of information done and we had to get it done in a hurry. People therefore had to bottom line things and summarize. I appreciate the fact that issues like protecting marine mammals, air quality, water quality, those are doable things. We can protect those, but I do not want to pass over the fact. I want to acknowledge fully in front of everyone that there are a lot of details here that will have to be worked through. This will be very tedious and will take a lot of time, and involve most of us at this table and our staffs etc. If we do do something exotic like some type of attempt at a reef or something like that. The ocean users, I am talking mostly about commercial fisherman. They have the very right to expect at a minimum that we would take into consideration their concern for safety and their equipment, and insure fully that that is taken care of.

The public I think has the right to expect in the base case that these facilities out there in the water upon decommissioning could be removed and the site returned to whatever uses are appropriate. I think that in fact is the law and that in fact in the base case is what we would expect to achieve for the public. I think the public also has the right to expect that if there are some other things that could be done, if there are other good ideas, and it may result in significant or worthwhile enhancement of the resource or enhancement of the values

of the surrounding community and state, that we should take a look at it. We should review it. We should along with our state, federal, county, and government partners, along with the public, make decisions that are appropriate for the situation that arises. So we will do that! I will speak for Minerals Management Service, when we entered into this venture with State Lands to take a look at the decommissioning policy and procedures. It was our hope to jointly work up a set of protocols and standards and procedures that would be amenable to both the federal and state agency, and would give the people of the communities and the state the confidence that what goes on out in federal waters will be at least of the quality that goes on in state waters. It looks like that given the type of platforms we have out in the federal water that the substantial depth we are talking about here, again California is going to be on the cutting edge. We are going to be the trend setters and I guess we are dealing with some pretty unique stuff. Nevertheless we will continue to work hand in hand with State Lands as we do on many other projects. We will work towards a set of criteria and common goals that will be mutually shared. We will diligently work with the Coastal Commission, with Cal Fish and Game, which I think has a major say in this whole issue, and certainly the Counties of Ventura and Santa Barbara, and the ultimate decommissioning and disposal of these platforms. We will try to define a program that could involve some more research and evaluations. We will develop a process that will bring the public into it and we will march down that road together. That will eventually allow us to reach a decision that is to the best interest of the general public. That is where I am at this point, and I have no idea what the ultimate answer will be.

Russ Schmitt: Thank you Lisle. Richard Schubel will give us his reactions now. Richard represents an agency that will be another major player in this process, the Army Corps of Engineers.

Richard Schubel: We are sort of a different player. I apologize, I wanted to attend, but could not attend, we are facing the so called crisis of El Niño in the LA area. So that is where our energies have been directed. Basically our role, being a permitting agency, we have to comply with the Clean Waters Act Section 404 and the Rivers and Harbors Act Section 10. What we attempt to do is take an impartial view. What drives our final decision or the direction of the permitting process is the project description. If you have shell mounds involved then it goes under Section 10. The true players are really the EPA. The final decision is really consensus building. We need to look at an array of alternatives. Generally we have to select the least damaging alternative. Now our role as far as NEPA. How we come into this document, is to determine if an EIS is required. We generally go through an Environmental Assessment. That is our first document and that will determine if an EIS is needed. From the project description we will also determine if we will be the lead agency, the co-lead, or a cooperating agency. If it is on other's land that we are not in charge of, then we would do our own Environmental Assessment or possibly adapt the document that is developed by the other agency. What I really want to emphasize is that the primary objective is to reach a conclusion for the public good. So that we do take a balanced view and that is what the permit will state. It will address all of the issues that have been addressed by you here.

Russ Schmitt: Thank you Richard. I am very pleased to introduce Maureen Walker from the U.S. Department of State, who will give her global perspective.

Maureen Walker: Thank you. I very much appreciate the opportunity to be here and to provide the global perspective. The first paper that I will comment on will be the environment section. I noticed the major observation or comment was on open communications. This is really vital and allows the United States to take a position of leadership overseas, because we draw that from you and from the discussions that you have. We have more transparency, more openness, and more public discussion in this country than any other place in the world. This gives us tremendous advantage in negotiations because we understand the perspective. Everything from your anglers, to your divers, to your environmental groups, all the way up till the industry. I want to really compliment all the organizers, participants, and all the questioners, because these are the questions they are asking at the international level and we are able, with your help, to provide those answers.

One thing that I would like to say in these opening remarks that as important as you plan how you are going to handle the decommissioning process out here in California, to be cognizant of the international instruments that are guiding U.S. decision making at the international level. The first, of course, is the 1982 United Nations convention on the Law of the Sea. It is very important to understand that as well as the convention on the Dumping of Wastes and Other Matters, which has recently been amended by a protocol, which the U.S. Department of State is presently preparing to send to the Senate for ratification. Specifically when we look at the environment recommendations regarding fish and marine mammals. I am reminded of an important article of the convention which you should become very familiar with and that is Article 60.3. There it says that removal should have due regard to fishing, the protection of the marine environment, and the rights and duties of other states. I think by taking a detailed look at the issues we actually are abiding by a very important part of the convention. Also you should become familiar with the international guidelines on removal, that were adopted by the International Maritime Organization in the late 1980s. You might wonder why would we have to pay attention to international issues, this is California. The reason is because of the fact your dealing in waters that are used for navigation by all countries. There is a concern by all those countries that there be unobstructed passage wherever possible.

Back to the issue of fish and marine mammals and some of the other questions that were raised and comments. I wanted to draw particular attention to those guidelines because they note that the determination of any potential effect on the marine environment should be based upon scientific evidence taking into account the effect on water quality, geological and hydrographic characteristics, the presence of endangered or threatened species, existing habitat types, local fishery resources, and the potential for pollution or contamination of the site by residual products from or deterioration of offshore installations or structures. The guidelines that guide governments in their decisions for removal say that the means of removal or partial removal should not cause a significant adverse effect on living resources of the marine environment, especially threatened and endangered species. I thought that you should realize that.

With regard to the issue of marine benthic organisms and the fact that the upper 200 feet is most productive. This is very important when you decide on whether or not you want to have an artificial reef. There are specific provisions in the guidelines for when and how offshore installation should be removed. There is one particular point that I wanted to make reference to. That is if it is decided that one will be partially removed, that an unobstructed water column sufficient to insure safety of navigation, but not less then 55 meters, should be provided above any partially removed installation or structure which does not project above the surface of the sea. I had not heard that mentioned and I wanted to make a comment on that. I think I have completed my five minutes, but I am available for discussions on the disposition question which I understand you have a lot of concerns about as well as some of the issues raised on the technical session. I think I can get to those when we have the question and answer period. Thank you.

Russ Schmitt: We will now hear from our state agency representatives. Starting with Brian Baird who is the Ocean Program Manager from the California Resources Agency.

Brian Baird: Thank you. I am here today representing the Secretary for Resources who sits on the Governor's Cabinet. The Resources Agency has overview responsibility for sixteen to seventeen agencies that come under the purview of the Secretary. The authority under which I operate is the California Ocean Resources Management Act, which was authored by then assemblyman, now congressman Sam Farr. The bill that passed required us to do a comprehensive analysis of the needs of ocean management for the State of California. In March we released the document "California's Ocean Resources and Agenda for the Future." This looked at stewardship issues, economic sustainability issues, research education and technology development issues, and issues of jurisdiction. I am happy to say that there are a lot of people in this room here today who have participated in the development of that document in assisting us. We had a section in

that document dealing with decommissioning and requalification of existing structures. I think the fundamental finding was at that time and I think it was reaffirmed here today was currently we have no comprehensive evaluations of these alternatives. We have a lot to learn. We have a lot to do, and the work I think has just begun.

In terms of recommendations. In essence we state we need a procedure for evaluating the various subjects and various aspects that get into the issue of looking at artificial reefs. What are we really talking about here? I think what we are talking about is an enhancement, is a value added kind of equation. I think that is something we all need to keep in mind when discussing the possibility of doing artificial reefs. Looking at the alternatives of total removal, leaving all or some portions in place, or other possibilities. Regulatory issues and all of those sorts of things come into this equation, and some of those things will be discussed by the individual state agencies that follow me. I think again on this valued added issue, I think you should be assured that the kind of analysis that we are looking at and doing is going to be aimed at. Are we simply looking at an opportunity here or are we looking at something that is properly designed and is indeed a value added contribution to the marine environment. That is a key point I would like to make.

Secondly, I was vice-chair of California and the World Ocean. A conference that was held in San Diego in March. We also had a session on this subject of decommissioning there. Just a few comments, it was interesting. One of the things we talked about on the ocean agenda is that we have a great deal of fragmentation. We have many, many agencies who get involved in these things. I believe it was Chevron who made the statement that they have had to deal with twenty eight agencies investigating this issue. Which underscores the need for us to come up with a process to get everybody in the same room and begin to figure out what our objectives are and where we need to go. Not just the agencies, but obviously all the many, many stakeholders.

We have a very different experience here. Yes, we would be on the cutting edge if we are looking at these structures in deep waters. The Department of Fish and Game has a reef program that has primarily been in shallow waters. So we are breaking new ground here. Also there is substantial difference between the Gulf Coast and the West Coast, and those differences are physical, they are cultural, and they are cost issues. They are all of those things.

When we do talk about science, one thing I have learned in my four to five year journey of looking at this comprehensive issue, is that we have to use science. We have to base this as much as possible on science. We also cannot have a naive faith in science solving all these problems within this time frame and do the best job possible. You have to do the best job you can to define your objectives and do the best job you can to determine whether this thing makes some sense or whether it does not make any sense. You will never have the scientific answers to give you the level of specificity that you desire. I think the State is continuing to do some ground work on this issue by looking at the liability issues, and looking at the biological issues, but clearly this cannot happen in a vacuum and we all need to sit down in a more focused form after this and begin to look at these issues. The Resources Agency in our role is happy to help facilitate this in any way we can. If there are issues or problems with bringing the state agencies together, we will help fulfill that role. On the other hand if we do not need to fulfill that role we will monitor what is going on. The last thing we want to do is be yet another participant in the room if we do not need to be. Clearly the key state agencies I think are the State Lands Commission, the Department of Fish and Game, and the Coastal Commission who are about to give their presentations. So I will let them proceed. Thank you.

Russ Schmitt: Thanks Brian. Bob Hight the executive officer of California State Lands Commission will now give his remarks. I also want to point out that Bob was here for the technical session and we appreciate that.

Bob Hight: I want to start by saying I am really very encouraged by the thoughtful dialogue that has occurred over the last two and a half days. I think the only way that we are going to be able to proceed is if we work together as a team. I think ultimately any resolution that comes out of that process is one that everybody can embrace. I really

applaud Lisle's efforts and cooperation in working with us and working with the other agencies to create a structure that is compatible for everybody to deal with.

Touching on a couple of subjects. Yesterday it appeared that there were two conflicts, one emotion and one science. People have some strong emotional feelings about are reefs good or are reefs bad? We need to bring science into the process to figure out really what the effect of the reef is on the environment and then make logical decisions from that. Any EIR or EIS that is done on this project or future projects will out of necessity, I think, require a myriad of state and local agencies. I think if they work together as a team in a joint EIR or EIS process it enables the public the opportunity to participate and everyone feels that they have had their fair share in the say. The Lands Commission's ultimate responsibility is to see that the public's trust is best preserved, and that can take into a lot of considerations, and I thank you very much for all of your participation. I look forward to answering any questions. Thank you.

Russ Schmitt: Next step is Susan Hansch who is Deputy Director of the California Coastal Commission.

Susan Hansch: Thank you. I am relieved that after two and half days the opening comments I made, I think, still stand. I think bringing all these people together reiterates the need to still communicate and the value of that. I am going to hit a few of those themes in my comments now.

One of those issues that I know we have not discussed in detail, is one of those issues that I brought up, is it really time to get rid of these facilities? Have we looked at all the opportunities and options? For the Coastal Commission that hits on some very important coastal policies, that is the concentration of development, minimizing impact while tapping the petroleum resources. The people of California and the resources of the state have already incurred impacts, and it is time to take those out? One of the important reasons to mention that issue now, is now is the time to look at the options. There are a couple of other themes of major issues that we need to get into immediately rather than waiting till we see an application in front of us or we start looking at the environmental impact report. We need to look at the big picture and regional options and the details. I am concerned that we might break things up so we are looking at all the details and then not putting the pieces back together and looking at the big picture. You cannot piecemeal it into such small pieces that then you do not see the overall cumulative regional impact. You cannot look at the planning options, and for me it has been very enlightening looking at the international impact we could have. I think that is very, very important. So I think that speaks to look at the details, but put it all back together as well.

That also strikes the theme of scientific work and the independent analysis, as well as the ability to look at some of these questions without a preconceived notion of what the answer is going to be. That also hits the theme of we need to do it soon. So that we have enough time to analyze some of these questions in detail. Science is not quick and the communication that we need in order to resolve some of these issues takes time. That is why it is so important and I am very pleased that Minerals Management Service and the State Lands Commission pushed to do this now. All the agencies are in this together and the public, the environmental groups, the fisherman, all the stakeholders. The Coastal Commission though is likely to be the last regulatory stop. That is just the way the structure is. That does not mean our decision is any more important. We are all going to be in this together, but when it comes to the place that we have to prepare recommendation for our commission and have the last round of public hearings, we have a lot of the decisions already made. In order to do that we have to get into the issues now.

That gets to my fairly specific recommendation and that is before we leave here today is to have some sort of an action plan, or working groups. What are the next steps going to be? Who wants to be involved? That may mean taking the key agencies that are here and coming up with a working plan, notify people that are on the mailing list, let people know what we are going to be doing, and identify what those issues are. Some of those issues we can probably deal with later, that are easier to resolve. The difficult ones like the issue of the artificial reef, some of the liability issues, some of the mitigation issues. We have to

deal with them soon! I would like to make sure when we leave here we do have an action to take the next steps. That is all I have to say. If there are any questions at the end I will be happy to discuss things in detail with people.

Russ Schmitt: Peter Bontadelli is here to give the perspective of the California Department of Fish and Game.

Peter Bontadelli: Thank you very much for allowing me to come down and join you today. I would like to first extend the commitment of the Director who was scheduled to be here today, Ms. Jacqueline Schafer. A death in the family has prevented Jacky from attending this week. She did ask me to specifically convey one very strong message and that is that the Department is strongly committed and she has a direct personal interest in working with all the impacted stakeholders, as well as all of the other state and federal agencies in helping to address the issues that arise with the question of decommissioning. As Brian alluded to the Department of Fish and Game will be deeply involved in several potential aspects of decommissioning. I will stress the word potential since the final decisions on what will be done on part of the Decommissioning or not done in terms of leaving the structure in place, will be made on a case by case basis, which is something that has been emphasized both by the working groups in terms of the reports I have listened to this morning and also by several of the agencies.

The potential and involvement of the Department is several fold. I was delighted to hear the State Department mention the IMO issues and the Law of the Sea and some of those questions. Since the "hat" I currently wear is the administrator of OSPR, Oil Spill Prevention and Response, is directly involved in the issue of maritime safety and traffic control. I will note for example that the Coast Guard is in the process of preparing to implement an IMO extension of the vessel traffic separation scheme to an eighteen mile nautical distance further to the north. That is predicated upon the existing Raycon operations at platform Harvest and therefore is an item that must be addressed as part of the decommissioning process. Likewise the depth questions, these would be the IMO regulations though their guidelines are something I know both we and the Minerals Management Service along with the Coast Guard will be looking at very closely as we look at any potential for having a partial removal question of any of the deeper platforms. I am totally confident that those issues can and will be addressed as part of the process as long as we plan for them and keep them in mind as we go.

In a different role you heard Brian talk about the fact that the Department is and has been involved in the issue of artificial reefs. In the event that the artificial reef option is chosen as a solution or a potential disposition option for any or all of the specific platforms that will be coming out, there are several things you need to be aware of. Our Department's involvement dates back to the 1950s and I am sure Dave Parker who made a presentation yesterday covered many of the technical aspects involved with that process. Specifically in 1985 the Fish and Game Code was amended and Sections 4620 - 4625 created the basis for our involvement in platform disposition vis-à-vis artificial reefs in state waters. The role and function of the Department in the exclusive economic zone of the United States beyond three nautical miles is not nearly as clear as either statutorily at the state or federal level and is directly related to the liability implications that come with that less than clear statutory authority. Perhaps amendments to one or both would be required if a complete artificial reef program with the Department in the lead is to be involved in that area. Other options in the event we are not the specific lead would include some form of operating as a permitee or in accordance as an agent, the federal government vis-à-vis MOU option, working with the Minerals Management Service, both of which have alternative points of view and liability implications and are ones that the Department is more then willing to explore, working directly with the Minerals Management Service and the Coastal Commission, and others, as we work our way through that process.

The third and most clear role that the Department would absolutely have is going to be that of a commentator in our public trustee role for the fish and wildlife resources of the State on any EIR or EIS that may be prepared. In that regard we will provide the best biological and scientific information we have, both as a protective agency for the State's

endangered species, as well as the other critters that we manage. We recognize clearly that we have some differing points of view even amongst our own stakeholders in terms of both the commercial industries and that there will probably be some form of joint discussions on an ongoing basis, both internally and externally as we proceed along the lines of addressing the issues of decommissioning, specifically if we get into the areas of reefs.

The Director specifically requested that I mention the fact that the Department is in the process of looking at a reorganization which is likely to create a new marine region with a very specific emphasis on the whole issue of what happens in terms of the overall coastal resources consistent with the directions outlined by Brian in the report that was submitted earlier this year. Specifically within that reorganization the artificial reef program which is already authorized by statute for the State will come into existence as a distinctive program and the interactions of that potential vis-à-vis decommissioning will therefore have a specific home within that Department's reorganized structure. That will not be our only point of contact as that we still have our ongoing environmental review and other items that will interface, but that will give you a single starting point for those discussions within the Department.

A couple of other quick issues to mention. The concept that engineering and augmentation of any discussion of reefs is an absolute critical point from the Department's perspective based on the research and past experience that we have had vis-à-vis reefs. Also I was delighted to hear the reference to both research and monitoring or evaluation, both of which are items that are currently addressed within the Department's guidelines relative to artificial reef programs that may or may not come into being as a result of decommissioning. The Department is fully committed to working jointly and cooperatively with not only the state agencies and federal agencies, but also with the local governments as well as all of our stakeholders and the other stakeholders involved in the process as we work our way through.

Lastly I would like to add the Director's thanks to both the State Lands Commission, Minerals Management Service, and UC Santa Barbara, as well as all the stakeholders for their strong participation in this conference, and I can assure you that the reports we get from Dave Parker and others who have attended the conference will be useful to the Director in the decision-making that she and the Department will be going through relative to the issues in the next few years. Thank you very much.

Russ Schmitt: Thanks very much Peter. Thanks for filling in so admirably. Now we are moving to the local perspective to hear from our local agency representatives, starting with Nancy Settle, Manager of Ventura County's Planning Division Resource Management Agency.

Nancy Settle: Thank you. Now we are finally down to the locals. The magnitude of this issue does definitely impact the locals, especially when we get to the onshore facilities and for Ventura County we do have onshore processing facilities and we are also the host to the Port of Hueneme, which is a major deep water port that could also be included in some staging facilities for offshore decommissioning of platforms. My involvement and observations that I have seen as the years have gone by at looking at these workshops, I've always come away with greater and greater understanding, but one of my first experiences with offshore oil issues came from staff back in 1988, saying we really have to get a handle locally here on the timing and the process and phasing for facilities, not only the installation at that point but I think it is also important with decommissioning. As far as my own observations with the three groups that met, I know that Dr. Byrd mentioned that the issue of facility reuse is something that we have not fully looked at and that Susan mentioned that as well. Also Mark Carr mentioned we need to really look at the framework for the whole process. And if anything else, I think with the local government response the more that we can continue to look at all aspects of this and look at the whole range of the offshore development. One thing in particular is the COOGR Effort, the California Offshore Oils Gas Resources study, which even though we are talking about decommissioning facilities, this study is looking at the onshore impacts to local infrastructure for different levels of continuing to get the oil resources offshore. I think this will have, and

we will need to come back and take a look at that, and see how that fits into the picture when we are talking about facility reuse, and also trying to pressure the local jurisdiction for responding to the impacts on our infrastructure. I know one thing our Ventura County staff and Lynn Cota mentioned, is what about the solid waste issue with respect to decommissioning facilities, bringing them ashore. In looking at some of the recycling potential, I know here in Ventura County we have limited landfill capacity and also if one of the options is to try to dispose of portions of the rigs in local landfills or elsewhere then of course you have the secondary impacts of the air quality issues. I am sure we are going to garner a whole other level of environmental review as we look at impacts and the results of those impacts. The more that we locally can work within this process and be kept informed all along the way, although frequently we do not get to jump in, this is a wonderful opportunity here, until it really reaches our onshore facilities and infrastructure.

The other point I wanted to make is the public process. It frequently ends up being the local agency that carries out the California Environmental Quality Act as well as the public involvement and input. We have heard a lot here from the different public representatives from various groups, but I know if we really get down to looking at a specific project that may impact Ventura County you are probably going to see a lot more different representatives from different public interest groups including the Taxpayers Association or the Sierra Club, and you may get even a variety of different responses as far as what their interests may be. That is pretty much all I have to offer except I do agree with Bill Griffin's first opening remarks, that we are looking at a whole process here and as much as possible for the local government involvement that we can try to encompass the whole package and not just pieces of it. I also agree with Susan's comments on follow up workshops and follow up groups to see what we can do to further work the rest of these issues out. Thank you.

Russ Schmitt: Thanks Nancy. Last but not least is Santa Barbara County. John Patton will be giving the reaction of Santa Barbara County.

John Patton: Thanks Russ. I tried to take the Bill Griffin pledge and listen. What I heard continues to reinforce to me the position of being a science skeptic. It is clear that there are some serious scientific questions that bear on management issues but it is equally clear to me that they are not going to resolve the most interesting management questions in biology and in future land use intrinsically wrapped up with value questions that are ultimately going to lead to government's issues, and the biggest mess it seems to me we have in this area is not our lack of understanding of the processes but the lack of any clear pattern for how to make decisions. This situation is laced with value choices. Which fish are we going to prefer? Which fishermen? Are we going to take long term or short term views? On the land use side of things, the thing that bedevils those of us that are concerned about the longshore infrastructure, is the question of after this project goes away, does its cousin come back within ten years when there is a different price forecast for this sort of oil/gas in the market that suddenly enables an offshore project to clear an investment hurdle and we recreate the damn infrastructure, the ultimate nightmare. So as Nancy mentioned, I think those of us who have onshore interests are very concerned with how the planning for decommissioning relates to the implications that should have come out of the COOGR study. Which is how much more development is there likely to be and over what period of time, and what sort of infrastructure that presently exists can it plausibly use? Without having a pretty good understanding of that it is going to be very difficult to make good decisions about the fate of the onshore support facilities and perhaps as importantly, the pipeline connections between offshore platforms, which could, under one scenario be abandon, and in another scenario become another platform for some other development or through extended reach drilling actually the base for developing new places. I don't see how we are going to make good decisions without having what were intended to be the results of the COOGR study at the time that we make them, and yet we have in the case of the Chevron facilities apparently fairly imminent set of decisions to make on decommissioning. Brian talked about the lack of specificity as being a characteristic of the science problem. My theme is that it is not just a lack of specificity but the value of

governance component has a good deal to do with how we conduct ourselves in this area.

Those of us who have been in lead agencies certainly have learned something out of this. As Bill Douros mentioned there was about a paragraph in a large document on abandonment. It was defensible at the time because of the assumption that we were talking about thirty years from now. Who knew what the technology would be on heavy lift? It turns out of course, that it was not thirty years but ten, and it was not three hundred to five hundred million barrels it was one hundred million barrels. It is possible that we should take this lesson rather seriously if we are presented in the future about the installation of the facilities that indeed they have to be removed in relatively shorter order than people thought. That might require some analysis, for example ten years ago even as now, the question of whether it would be physically possible to do what the documents assumed, namely complete removal at least as a default solution to the platforms was even possible to accomplish. This brings to mind some rather sad other examples in resource management having to do with nuclear fuel rods. It is foreseeable you are going to have a problem if you do not have any idea how to solve it. What business do you have putting the facility in in the first place? We thought we had thirty years which made it seem reasonable to take that approach, but we did not. The larger question might be if there really is only one hundred million barrels and ten years of life in the project was it worth putting it in? Was it maybe not only a bad business decision but a bad regulatory decision to allow a project like that to go forward? All the construction related impacts occur and were presumed to be amortized over a larger amount of production and a longer period of time. Arguably, it should become the duty of the priory agencies who approve exploiting the resource to come to a conclusion of whether the resource is really there, before the society is invited to absorb the impacts that go with exploiting it. I urge Minerals Management Service and State Lands Commission should take on as part of their role evaluation of how reasonable is it to suppose that the amounts of the resource the companies think they are going to extract when they go into a project are really there to extract under various price forecasts which might be used. I don't mean they should second guess the business decisions of the companies. Those are reasonable rational decisions, but there is a regulatory interest there that I think ought to be part of future considerations.

Further on the CEQA question, talk about the feasibility of removal makes me a little itchy. If it is true that decommissioning facilities is simply part of the life cycle of facilities and if it was feasible to put them in, and if the impacts of taking them out are more or less the same as the impacts of putting them in then surely it is feasible to take them out. It is logic chain, that when people say clearly it is not feasible to fully remove the facilities. I do not think that is a prior conclusion that we can accept. I think we clearly need to look at what does that mean? Why is it not feasible? What kind of costs are we really talking about? What type of alternatives are there really? Before any are pushed off the table with a messy dismissive label.

On the consolidation site question which I touched on briefly about COOGR which Jim Lima raised yesterday, I cannot resist one little dig. Something which seems pretty reasonable now from a land management standpoint was the occasion of a litigation by the oil industry against the County of Santa Barbara when the policy was imposed in federal court. I think we deserve a little credit for looking down the road a bit. As we talk about decommissioning I am sure we will be hearing a lot about "well you know there might be some future use for these onshore facilities and pipelines," coming from the same people who thought we should not have such a policy in the first place. We will not forgive that and move on.

It is worth noting that neither Gaviota or Los Flores Canyon have in fact functioned as consolidated facilities because no one else has come along to share them. There have been various permitting scenarios that have been played out but none of them have led to actual investments and projects. So we do not have actual functioning consolidated sites, but we do have the capacity for them.

At the local government level we look at the lessons of what happens when we allow removal to lag behind disinvestment which has been documented quite nicely for Santa

Barbara County in the past and we compare it against the uncertainty, both economically and technically, about how and whether additional offshore plays may come into production in the future, it puts us in a real dilemma. We don't want to cause needless disinvestment through decommissioning followed by reinvestment. We don't want the impacts of that either. On the other hand we do not want to get stuck holding the bag, with the rusty bucket facilities that turn out not to be anything anybody can use down the road. So it is a significant choice that requires some uncharacteristically open consultation with the industry about the future because these are business decisions that are going to drive this level of interest, not something the industry has been fond of talking about with local government or with each other for both legal reasons and competitive advantage reasons and yet I don't see how we can make much sense out of this without talking about those issues.

My last question is a very small one. On the rigs to reef issue, if in the fullness of time, if the present site of a jacket is going to be a pile of rust, and if as Dave Parker said it really does not have a whole lot of value unless you pile a bunch of augmentation materials around it anyway. Why do the present locations of the platforms make sense as a place to have artificial reefs. Does it not matter where they are? I think based on some things I have heard we are going to have to seriously look at the question of if artificial reefs, why at the present location of the existing platforms? I do recognize that this is an already identified issue, but it became clearer to me that in the long run the presence of the jacket does not have much to do with it. Thank you.

Russ Schmitt: Thank you very much. At this point I would like to open up to questions not only for the panel members but also address any issues you might have with any of the reports given by the session co-chairs. And please this is not a public hearing.

Bill Stolp with Dames & Moore: I have a question/comment. The last five years I have been in the UK and Norway working on platform decommissioning facing many of the similar issues and problems that you are facing now. I would like to agree with Lisle in that the more you assess the less you know. We have been applying science and analytical techniques to the questions that come up and I would like to say however, that California is not on the cutting edge!! You guys have some unique issues, but you are not ahead of the game. You are a little behind it, I would say about five years. What I would like to do is reiterate that you do need to put a methodology in a process to assess and analyze the issues. It needs to be a methodological approach to assess the technical, environmental, safety risk, and cost issues. You have to be able to address what is a scientific issue and what is a perceived value issue. They do not always see eye to eye and you need to be able to differentiate between them and know how to assess and handle those. So down to the actual question which goes to Minerals Management Service. Is there going to be another workshop similar to this in the future? Could it be possible to include more of the technical and scientific methodological assessment process from the lessons we have learned in the North Sea in those presentations? If you do include that I will be willing to coordinate that effort.

Minerals Management Service: I do not know if we have talked about what the next step is. That is in fact one of the problems ahead of us is, to define a course of action for the next few months and ultimately the next year or two. I do not know if the next time would be a meeting of this nature or something specifically oriented towards a set of options. I think at this point it is wide open. I think we need to work with the others at the table.

Linda Krop with the Environmental Defense Center: I do want to point out one distinction of what happens in the Gulf of Mexico. There are a lot of good lessons to be learned there. Some things that we probably want to follow and some things we probably do not want to follow. The question of liability is one we do not want to follow in that first of all the states do assume the liability. They are supposed to receive half of the savings that the oil companies retain by not removing the structures completely, and apparently there is an issue as to whether they actually receive the full amount they are entitled to.

Second of all in terms of compensation to commercial fishers, the Gulf has a blackout policy. If a commercial fisher looses gear or equipment and is compensated, that area

becomes blacked out for future claims. So if another fisher enters that area and has loss as well, they cannot receive economic compensation. Well the entire Gulf is blacked out. So fishers are filing claims, but they are not being compensated. I think that is a lesson we need to learn and we do not want to have that kind of liability absolved here.

My comment was going to be that I am pleased to see so much support for pursuing these issues that were raised at the conference further and with the qualifications expressed by John Patton, that a lot of that effort should be focused on the science. I would like to make a suggestion. Many of us in this room and on the panels have been involved in a very indepth process dealing with high energy seismic surveys. It has been a cooperative effort of the federal, state, and local agencies, as well as the public industry, fishers, etc. One of the things we did in that process is we had a sub-component that looked at the science of the impacts of high energy seismic surveys primarily on marine mammals. The committee searched out experts in the field and developed questions for them. We had about twelve experts we brought into a room and we watched them debate the issues and discuss them for a day and a half, and it was fascinating. People who probably have never been in the same room before were. What was especially fascinating was the consensus that they achieved on virtually every question that we asked them. We are still getting some of those answers back in final form. We are finding out, number one, some very good answers to some of those technical questions. Number two, we are finding out where we need more information and what research should be conducted. I feel that we are in a very similar situation here. We have some information, and everyone seems to agree that we need more information. I would suggest that as a process to try and acquire that information in a collaborative effort.

Lisle Reed: It makes sense. I agree with Linda. It has been working very well with the high energy seismic theme effort. I think we may want to look at pursuing something similar to that. The success has been very good with the high energy seismic team. They put the science into a court all of its own and get the right people in to talk about it.

Brian Baird: In the ocean agenda, in our strategy we talked about, it is a different situation, but I think it is applicable. The joint review panel process for doing environmental impact reports, and quite frankly when I used to work at the Coastal Commission, I think I would characterize it as us sending a missile down to the Los Angeles office of the Minerals Management Service and them having to counterattack. We would go back and forth over these issues until one day somebody said," why don't you all get into a room." We were in this room at times from 6:00am till late into the evening, going over all these issues, line by line. The one I was involved with came out with a document that we all agreed on. There was no litigation on the document. It is something that we think makes a great deal of sense, but it does need a structure in order to make it work.

Linda Krop: One quick comment on that. Lisle isn't that particular high energy seismic safety meeting, that is also facilitated? You just do not throw people into a room and ask them to solve a problem?

Lisle Reed: Yes it was well organized and well facilitated.

Sue Benech, Marine Biologist: I have a question for Mark Carr. I am posing it as a question, although it is a little bit of a comment too. We have talked a lot about marine mammals, fishes, and mobile invertebrates. I was shocked to hear of the removal of 3000 tons of attached invertebrates on these platforms. The question I would like to pose to Mark is since these platforms are not just reefs, but are actually islands because of their vertical zonation, has there been any discussion of what they may serve as seed communities for shallow sub-tidal and inter-tidal coastal area that are heavily impacted by anthropogenic influences? This may be an important issue to follow up in as far as science is concerned. I get knocked back and forth, Linda left me positive and Mr. Patton left me negative. It sounds like science is moot, and it is mostly impression.

Mark Carr: Thanks. That is a really good question. Unfortunately it is one of those that is very difficult to address, that is the problem with marine populations that exist on these structures. They are characterized by larval

dispersal that is the mechanism by which they may potentially replenish other populations and communities elsewhere. The problem is we do not know very much at all about those patterns of larval dispersal. This is an issue that raises its head in applied marine ecology constantly. I just spent last week at a National Marine Fisheries service workshop trying to design and consider the role of marine reserves as fisheries enhancement strategies. It is the same thing that keeps coming up, how do you design or locate reserves, or in this case artificial reefs, that might contribute to other populations? We just do not know those connections, but certainly that is a very viable possibility that the organisms that exist on these platforms act as a source of larval replenishment to other populations nearshore. On the other hand, just like marine reserves, we have to be cautious because they may also have absolutely no effect. It is all dependent on both the environmental conditions that influence the dispersal of organisms from that site and the characteristics of larvae that determine their pattern of larval dispersal. I wish I could be more positive, but it is one of those things that science needs to address.

Tom Raftican from the United Anglers: I want to pretty much follow up on what some people have already said. For example Susan Hansch said," Let's get the next step planned before we leave." I think Mr. Baird was excellent in his comments too. Maybe instead of planning the next step let's try and get together. The only thing I would like to add to that is we have some outside stakeholders and the "big" boys. We both would like to be informed along the way and also as they are developing information in each area. We need some sort of access to that information across the board. So that instead of coming not knowing what is going on in different areas, if you come to a meeting, an association, or a group, with the information already available to you when you get there, we can come out with much better conclusions from that instead of discovering everybody else's information at that time. So just something to think about before we leave. Thank you.

Connie Hannah from Santa Barbara League of Women Voters: I just wanted to thank Maureen Walker for bringing up the vessel traffic problem. We had spent two days and we had never talked about the possible impacts of intact platforms being a problem for vessel traffic. Barry Schuyler of UC Santa Barbara wrote his Ph.D. thesis on tanker traffic in the Santa Barbara Channel. He told the Santa Barbara audience that if you wanted to consider the ultimate disaster, you considered an ocean going tanker running into one of the oil platforms. I think that we must keep in mind the vessel traffic. We are delighted to hear that they are talking about a separation system finally for that traffic. As we talk about deep water platforms, we have to consider the vessels too.

Maureen Walker: I did want to state that in the Law of the Sea Convention, which I referred to quickly earlier, I did not quote one part of it which is very important, and that is from Article 60.3. That says that any installations or structures which are abandoned or disused shall be removed to insure safety of navigation. That is a number one issue. Then taking into regard what I mentioned before, the fishing and the marine environment, etc. I think a little history on this might be of some use to this audience. Back in the late forties when the industry was just getting off the ground, the United States Navy was quite suspicious of this activity because they thought the oceans belonged to the Navy. They did not want to see offshore oil and gas go in, but as it went forward their provisions put in an international convention, the 1958 Convention, that all structures would be removed, and the Navy had a lot to say about that particular provision. As the industry developed and went forward it became apparent, and mostly through some of the North Sea governments and also the United States, that there were going to be cases that not all the platforms could be removed. That is why the 1982 Convention on the Law of the Sea does have some flexibility here, but the guidelines that were drafted in the International Maritime Organization presumed that most platforms will be entirely removed. The exceptions are the exceptions to that rule. There are ways and means, and the guidelines go through them, but I just thought it is important for you to know some of that background and what was involved in developing those guidelines. Thank you.

Lisle Reed: I have one comment relative to the issue of tanker traffic inside the channel. I will observe that the state does definitely share

the concerns that were expressed in that. I believe today you will find that there is essentially no tanker traffic left inside the channel, particularly carrying crude. That is something that you will see even more strongly reinforced in the process of the Coastal Protection Review Document, which will be coming out shortly from our office. We anticipate nearterm publication of that. We also have a series of discussions underway on vessel routing issues, both in the Monterey Bay Sanctuary and also related to air quality issues coming out of Southern California. Those groups and operations are jointly being worked on by both the Coast Guard and NOAA as part of the issues in which the State is deeply involved. I think many of those issues that you raised will be resolved. There are however significant amounts of ongoing container traffic, which does have significant amounts of bunker, which does not completely eliminate the concerns that we have for any traffic that does remain in the channel.

Maureen Walker: Just one last thing. I have to put my hat on as the chair of the National Security Council Interagency Working Group, where we have to take into account the wide ranging views of our blue water interests; the Navy, the Coast Guard, as well as the coastal and marine interests of NOAA, EPA, etc. To say this issue of navigation is not one that is speculative, in the 1980s a German submarine did run into an offshore platform, and it is of safety concern. I just wanted to make that point. Thank you.

Arvind Shah: I am associated with the Gulf of Mexico office with Minerals Management Service in New Orleans. In the last ten years I have been involved with maybe more then 1000 applications, 70% of them with explosives, 30% of them with non-explosives. I have some experiences in these removals. I would like to make a few comments over here, about this rigs to reefs fund which was established by Louisiana and Texas. That fund is strictly dedicated to those rigs to reefs issues. For example they maintain the buoys out of that fund and they have not received any lawsuits yet so far. With 123 structures in this rigs to reefs area I am sure there is more than $13 million in that fund. If you try to follow the same thing over here I would advise you adopt a similar fund that is dedicated to the rigs to reefs issues rather then that money going to the state treasury and waiting for that money to come back to the agency. I think that it is very important because the states of Louisiana and Texas passed tough legislation and dedicated it to the rigs to reefs issues. In the Gulf of Mexico office all the removals we have done so far, we have not allowed this partial removal or totaling of the structure in place. The only time we have allowed this partial removal or totaling in place was in association with the rigs to reef structures. Minerals Management Service on their own in the Gulf of Mexico has not allowed any partial removal or totaling in place. Our regulations as they exist now require that all the platforms and all the structures, at the end of the expired lease, within one year be removed, regardless of water depth. Those are our regulations and that is what we try to follow. Regarding this rigs to reefs partial removal we do not have direct input, but most of these partial removals are done 85 feet below the waterline. In some cases they are removed less than 85 feet below water line. Minerals Management Service does not have an input in those partial removals from the waterline to the top of the removal. That issue is decided by the state through the Corps of Engineers and they consult the Coast Guard regarding the water level between top of the platform and sea level. They decide what type of buoys or aids to navigation should be placed on the structure if it is lower then 85 feet.

One last thing I would like to tell the audience here. We have a very good web page for those of you who like to "surf" the net. Our address is www.mms.gov. We have a lot of information available. All our NTLs, all our LTLs, all the removal data on the platforms. We have about 1300 applications available on the internet. It is all on the internet. You can download it and it is free. Also we have public information available on the Gulf. We also have a toll free number that offers a lot of information and free hard copies from our offices. I am also willing to answer any questions while I am here. Thank you.

James Wiseman, graduate student at UC Berkeley: I was glad to hear about the web site. I have been talking to people about sharing information and we have talked about the need for sharing information. I would like to suggest, and people have agreed with me, that we host a public web site on a government

agency machine for information sharing. Here we could put together the proceedings of the conference, some conclusions, and pictures, etc. Thank you.

Win Thorton, member of the Artificial Reef Advisory Board for the State of Texas: I have a comment. I would like to say a couple of things about our program in Texas. It is a very comprehensive program. We started it back in 1980, and it is not just rigs to reefs. We have a lot of other materials and reef sites developed. We have liberty ships. We have purpose built reefs in nearshore areas. We do have rigs to reefs. We have concrete, rock, and fly ash blocks. We have a program that looks at a variety of materials and a variety of siting criteria. We also have an advisory board that is made up of the various stakeholders groups, be it oil and gas, be it recreational fisherman, commercial fisherman, divers, etc. So their input is developed and included in any of the siting or criteria that we do.

The fund that we have for the State of Texas is solely devoted to development of artificial reefs. The donations that are put there are used to maintain marker buoys as required to enhance those reef sites to cover any future liability should it occur. We have actually accepted donations from the oil and gas companies that have saved money. We have also paid money out to develop nearshore reefs that cost money. This was for recreational divers and recreational fishermen. We are actually funding the development of nearshore reef sites. We do deep water to a couple of hundred of feet, to shallow water reefs, to meet the needs of the multiple users in the state of Texas. Thank you.

John Smith of Minerals Management Service: Maureen is dying to get to this question, so I have to give her the opportunity to get into this issue. The issue of deep ocean disposal came up in several of the sessions. I would like to ask Maureen to address that for the benefit of the audience?

Maureen Walker: Thank you very much. By way of background it is important to know that what guides that particular issue is the London Convention. The London Convention is recognized as the source of the global rules and standards on dumping that are referred to only in a general way in the Law of the Sea Convention. Today we have 76 parties to the London Convention, but what is not good is that a little over half of the oil-producer states are not members. We have been trying to encourage more participation by those governments. In 1996 the entire regime of the London Convention was re-worked through a protocol. This protocol will replace the convention. It is a free standing agreement to which both contracting and non-contracting parties may become party. This represents a culmination of a multi-year process of revising the Convention which began in 1992. The structural revision of the Convention is called the Reverse List. Basically what this does is contracting parties are obliged to prohibit the dumping of any waste and other matters unless they are listed on an annex. In the first annex there is allowance for the dumping of bulky items, vessels, offshore platforms, and other manmade structures. So there is an allowance to have these dumped at sea, but there is, as you can imagine, a rather involved process in order to accomplish it. What is occurring now within the scientific group of the London Convention are meetings of experts and scientific experts to try to come up with what is called the Waste Assessment Framework for the dumping of these particular items. That is an ongoing process and the next meeting will occur in the first week of April in South Africa. I have seen some of the early documents and they take into account many of the things you are raising here, because the disposal at sea option will be required to use best environmental practices. There are a number of considerations that every coastal state, and when I say coastal state here I mean nation, must take into account, including the issues I mentioned earlier; the fishing, the marine mammals, and the fact that the materials must be completely flushed out and cleaned, etc. before they are dumped.

There are provisions in this draft of this Waste Assessment Framework on site selection. What governments should look for; the physical and biological characteristics, the oceanographic characteristics, amenities, values, and other uses of the sea in that area, economies and operational feasibility. They have to look at geographical positioning and my understanding of U.S. Domestic Law is that this is regulated under Title One of the Marine Sanctuary Protection Act (MSPA), and that EPA, and the Corps of Engineers together

identify such areas. The answer to your question is yes, deep disposal will be allowed. It will be on a case by case basis. This is the considered opinion of the international governments that met in devising the protocol. In the face of the move by one government to actually have a moratorium on such disposal, but that government was not successful and we now have a situation where we hope by having the guidelines and standards there for nations, we may now be able to bring in some of the other oil-producing states. That is a big interest of the United States, although we have over half of the offshore oil platforms there are other platforms in other areas of the world where there is very little consideration as to the operation or decommissioning. As a result we are anticipating and co-sponsoring with the government of Indonesia, in April of this year, a conference on decommissioning to bring together economies in the Asia Pacific region to address this issue, which has economic importance as well as environmental concerns. It does again go to the issue that I raised when I began this morning which is the issue of the United States' leadership in this area. It is our companies and our environmental awareness and concerns that we bring to these countries and help them improve their standards in a way that really benefits the entire global environment. That is really our objective. Thank you very much.

Melanie Stright with Minerals Management in Washington, D.C. : I very much agreed with a comment made by a gentleman a few speakers earlier. It would have been very nice had participants been made available a lot of information up front so they could have digested it and brought that knowledge to the discussions ahead of time. Along that line I wanted to mention that several times this morning the IMO guidelines for platform removal for the purpose of navigation safety have been partially quoted and talked about. I do have copies of the IMO guidelines with me if anyone is interested and would like to see those. The only other comment I would like to make is over the last few days I have heard a couple of times it said that in terms of the artificial reef programs in the Gulf of Mexico that the oil companies and the states share the savings fifty-fifty. I wanted to point out it is my understanding that nowhere is it stated that this savings is 50% or that is what is donated to the states. It simply says that the savings will be shared. Thank you.

Russ Schmitt: About the issue of having materials beforehand, we are still waiting for some of the position papers that were due a month ago.

Tim Watson with Amoco: Greetings Americans. How are you all? I have a question for Maureen, but first a short preamble. I think the international side of this is very vital and that is why I am glad to see Maureen here. You must be very careful in California not to take a "holier then thou" attitude on the sea. I come from a small island where it is only seventeen miles to the nearest beach. We have been there for 1000s of years and there are 55 mammals that live on it, so you must have your perspective of how you and the ocean can live side by side.

In terms of the impact of the world, I think that I am right in saying that 350 million Europeans will take much more notice of what happens out here in the Santa Barbara Channel then the rest of the United States. I think that is what Maureen is on about.

The U.S. Constitution I do not know much about, but I know it is based on common sense, give and take, and communication. It is probably the only legacy that the English left you, I hope. The communication must be with the North Sea. The Dames and Moore representative behind me was quite right that technically, even the Gulf of Mexico, is not up to speed. They have not had to be because they have shallow water platforms which is not what you have. So ignore them and come to the North Sea. We have already said we are here to help and pass on the technology. You cannot do science on this unless you know technically what you are going to do with the platforms. This technology needs importing. You cannot make a decision without it. You need to know what the regulations are. You need to know intimately what the IMO means to yourselves and to the rest of the world, because believe me the world does take notice of what the U.S. does.

We do not use the word feasible in taking platforms out anymore. We could put a platform on the back side of the moon if we wanted to. The oil industry is extremely clever.

Five years ago we said only when feasible and we got exactly the same kind of reaction, quite rightly from the mothers of the moon that you would expect. It is feasible, anything is feasible. The question you must ask yourselves is, is it worth it? Is it worth the journey?

Let me have a quick note on some of the other aspects of this. Environmental impacts, I am sorry to tell all the environmentalists here, but they are very, very small in global terms, but have fun in finding something that really has an impact. If you do find something that has an impact I am on the internet so please let me know.

Much more important is the communication which I will come on to, but common sense arguments and I stress the word that was in your U.S. Constitution, common sense. You have got to use common sense. You cannot have it all your own way, whether you are the oil company, or the man in the street, or the representatives of the man on the street. You have got to have common sense arguments. Believe me, I have been there. They have much more impacts than science. I am afraid that scientists and lawyers come at the bottom of my believability chart. I am just an engineer and I am much more believed by the housewife. We are talking to the housewife in the end, because they are the ones that vote in the politicians. They have the say in the end.

On reefs. In the U.K. or the North Sea we do not talk about artificial reefs. We acknowledge that they are a nuisance to the users of the sea. We come back to is it worth it? And we compensate the users of the sea. We do not hide behind anything like a reef. It may well be different here, but I can assure you the whole industry is not pushing off junk platforms and calling them reefs. That is not the case. We recognize they may be valued in some parts of the world not necessarily the North Sea, but they are an impediment to navigation. They are not an environmental problem. Impediments can be compensated for and that is the only way forward if it is worth it to leave it.

Deep sea ocean disposal has come up several times. Assuming if you can get beyond 200 miles from the U.S. Navy, you can dump whatever you would like. I imagine that is probably the basis of the law. Whether it is worth it is another thing. Technology says you cannot actually do it. Amoco's point of view is if you have a jacket on a barge and you have gone to the trouble of lifting it onto the barge, then take it ashore. Do not dump it! It simply is the wrong thing to do. Take it ashore and recycle it, reuse it. Do not dump it just because you have it on a barge. You have to evaluate deep sea disposal. That does not get into the Brent Spar which is something different. The Brent Spar is not a rig, but a floating storage barrel.

Liability, we are very clear in the U.K. about this. The only people that are going to be around in fifty years is the government. They ultimately should take the liability, but you make the liability as small as possible. You clear up your debris, you compensate the fisherman, you give them buoys if that is what they want, you give them instrumentation if that is what they want, you give them new ships, if that is ultimately what the people want and is worth it. So you do bend over backwards for your customers and ultimately the people are your customers. As Shell found out when your customers get mad they fire bomb your gas stations. So look after your customers.

Finally it is common sense, do not forget that. Common sense is the only way forward. I do make a plea based on five years experience, that cut out the lawyers, cut out the scientists, and get down on your knees and start talking to the house wife, and start talking real impacts. Let the housewife know exactly what this is all about. First of all tell them what a platform is. Affably, smile on your face. Let's not have this aggravation that is apparent here. We have had that and it does not get anywhere. Let's have a smile on your face. Let's keep our feet on the ground. A lot of give and take.

The oil industry must go out and do its technical work. Then you can do the science. The oil industry must invest in the best things possible, it has to, not the contractors, they have no need to do it. The oil industry must do that and that is what they should be pledging.

Finally you must have patience. This is a long drawn out thing. We are in unknown territory. We all use gasoline. We are all responsible for

the platforms being out there. The oil industry can make a pledge to you right now that if you stop using automobiles we will stop drilling for oil. It is simple, but it is absolutely true.

Now my question, leadership, to Maureen. If you totally remove your platforms in the Gulf of Mexico because you get pushed into it, because it is not worth it, and it is not the common sense thing to do. Maureen what impact do you think that is going to have on the American oil companies in the North Sea and around the world, if they too get pushed into it? Thank you very much.

Maureen Walker: Could you just repeat. Did you say total removal in the Gulf of Mexico?

Tim Watson: Yes, if you go for total removal and it is not the best thing to do, and the Americans are showing leadership, and they opt out of a proper decision, what impact is that going to have on the North Sea? Where we have many more, and a lot of American oil companies own a lot of real estate.

Maureen Walker: One thing that your comment on, and asking me to comment on leadership, points up to me, and something I always say before we head off to a negotiation somewhere in the world, is that the most difficult negotiation always happens before we leave our shores. That is because we do have so many competing interests to take into account and the scenario you projected for the Gulf of Mexico would not be possible because of all those various interests that we have to take into account. In fact as I indicated earlier, when Denmark made the proposal for a moratorium we could not support it as an oil-producing state. That was unacceptable, and also because we do tend to take the common sense approach, looking at the science and taking all the views into account. That leads me to one other comment that I would like to make, that is an attempt within international organizations to try to regulate the oil and gas industry on an international basis. This is something that we oppose because the regions are different. The North Sea is very different from the Gulf of Mexico, which is very different from Southeast Asia, etc. It is these differences in regions that have scientific implications, legal implications, that we would take into account. For this reason we will continue to oppose what I consider a "head in the sand" approach. We do have expertise here and we would never want to ignore it. Thank you very much for the opportunity to make that comment.

Russ Schmitt: More questions? Comments?

Bill Stolp: I would like to make just one final comment. I promise this is the last time I will comment. An interesting postmortem of the Brent Spar backs up exactly what Tim Watson was saying. The postmortem of the Brent Spar incident, it was done exactly by the regulatory regime. It was done with good science, good economics, and good technology. The point here that everyone needs to listen very carefully to, it was the German housewife that turned that around. They tried to prove a technical problem. They tried everything they could, but it was not until they got onto recycle of 14,000 tons of steel. Now the German housewife is the most efficient recycle entity in the world. Virtually everything that comes into her kitchen is recycled. When she found out that there was 14, 000 tons of steel that was not going to be recycled, she did not care that it cost $5,000 a ton to recycle it, when you can go out and buy new steel for $200 a ton. I leave that with you as a point of what Tim Watson was trying to make. Somebody outside Ventura County, somebody outside California, somebody outside the continental United States of America, can have one hell of an impact on what happens offshore Ventura County.

Susan Benech, Marine Biologist: I just wanted to make one final comment. What I learned in the past three days, I brought back with me "3 C's." That is Common Sense, big underline under that, Communication, ten underlines under that, and Cost, both environmental and economic. That is what I have learned and I am glad I attended. Thank you.

Russ Schmitt: I would like to thank you all, the panel members, for both their insight as well as their willingness to listen and answer comments. I would like to give a very brief summary and closing remarks. This is clearly a case where less is more. It seems to me that there were lots of "letters," for example the "3 C's," common sense, communication, cost, "S & S," science and safety, "L & L," listen and learn. It is the "listen and learn" I think that we

all did. That is what Bill asked us to do early on, and I think we did it very well.

One of the purposes here was for us to find out more about what the issues are. To find out more about decommissioning, the process as a whole. I think we did that. We listened to each other. As a result we have a better appreciation, a better sense for where we all agree, where the common ground is. We have a better sense of what we do not agree on. We have a better sense of why there are those issues that we do not agree on. I think it was a very valuable exercise for us to come to that in these past couple of days. The big issue that confronts us is where do we go from here? That is one that we are not going to have a quick answer from. So it is something I want you all to think about. Quite clearly we are going to need to have more of these types of sessions, maybe not in this type of format. It is going to be very useful for all of you to give feedback to Minerals Management Service and the State Lands Commission on where we should go next. Those agencies are going to have to take a step back and digest what they have learned and heard too. Maybe the next time there will be more focus groups. We heard a lot for example from Rigs to Reefs, maybe we need more on Rigs to Reefs, but in a different kind of format. We do not want to beat it to death, but yet there are issues there that need to be resolved. We touched on them. They are still important, even if we do not agree on them. We still need to worry more on, for example liability issues, or the alternative use issues. Please let's walk away from here thinking more about these issues and how we are going to deal with it!

With that I want to thank all of you for participating. I especially want to thank the State Lands Commission again and Minerals Management Service for hosting this timely workshop. And a special thanks to just a few people; Frank Manago, John Smith, Minerals Management Service people who did a heroic job in helping organize this thing, and especially to my assistant, Bonnie Williamson, who actually did everything. Thank you very much.

POSITION PAPERS

POSITION PAPERS

Position Papers were solicited from over 100 ocean-user groups (oil and gas industry, environmental groups, commercial fishing and recreational fishing). These groups were asked to submit their positions on the various issues that would be discussed at the workshop. Each group was asked to submit up to one page on the 16 issues below that had been identified by the working groups. Ocean-user groups were asked to submit one set of position papers, reflecting the position/opinion of the group.

Following is the list of issues and list of disposition options which was distributed to the ocean-user group representatives.

ENVIRONMENTAL ISSUES [addressing the effects that occur ***during*** the actual removal process, or as a direct result of removal (e.g., anchor scarring)]:

A. Air Quality
B. Commercial/Recreational Fisheries (effects *during* removal - long-term effects addressed under Disposition Issues)
C. Marine Mammals
D. Marine Benthic Impacts
E. Water Quality
F. Contamination/Remediation of Onshore Sites
G. Future Land Use

DISPOSITION ISSUES [addressing long-term effects of the decommissioning process]:

H. Commercial Fishing
I. Recreational Fishing
J. Habitat Value
K. Enhancement of Platform Structure
L. Site Clearance
M. Onshore Disposition (ultimate fate of materials - reuse, recycling, etc.)
N. Social Impacts
O. Economic Impacts
P. Fate and Longevity of Materials

DISPOSITION OPTIONS (you may want to address issues in light of the various options listed)

- Non-Removal of Platform, Alternative Use
- Full Removal of Platform
- Remove Topsides, Partial Platform Jacket Removal, Topping (e.g., remove jacket to 85’ depth, leave remainder in place)
- Remove Topsides, Partial Platform Jacket Removal, Topple (e.g., cut platform at sea-bottom, topple in place)
- Remove Topsides, Move Platform Jacket to alternate site as Artificial Reef
- Remove Topsides, Deepwater Disposal of Platform Jacket (e.g., cut platform at sea-bottom, transport to deep water)
- Full Pipeline Removal
- Partial Pipeline Removal
- Onshore Facility Removal, Restoration

ENVIRONMENTAL USER GROUP REPRESENTATIVE, DISPOSITION PANEL

LINDA KROP
Environmental Defense Center, Santa Barbara

As stated in the EDC's position papers on platform abandonment and shell mound removal, environmentalists in the Tri-County Area (Ventura, Santa Barbara, and San Luis Obispo Counties) support complete removal of offshore oil and gas facilities upon project abandonment. Complete removal is necessary to avoid safety hazards and to ensure restoration of the natural environment. Removal is also consistent with existing state and federal laws and policies.

Contrary to these laws and policies, the oil industry desires to leave platforms in place, allegedly "converting" the platforms to "artificial reefs." However, there is no evidence that platforms function as reef habitat. Although fish may congregate at the platforms, there is no evidence that the fish would not exist without the platforms, either elsewhere in the ocean or at natural reefs.

Any decision to change existing laws, thereby allowing the oil companies to avoid their responsibility to remove the platforms, should be based upon an objective analysis. As many of the other workshop speakers pointed out, an artificial reef program must be based on science, not the economic whim of the oil companies. The most pertinent scientific paper on the subject is "Artificial Reefs: The Importance of Comparisons with Natural Reefs," by Mark H. Carr and Mark A. Hixon (*Fisheries, Special Issue on Artificial Reef Management* 22(4):28-33). As stated in that paper, research should be conducted to determine whether artificial reefs merely attract fish, or whether they provide a habitat for increased production that would otherwise not be possible. Production is determined by examining how the reef affects fish reproduction, growth, emigration, and mortality on a regional basis. Studies conducted thus far indicate that artificial reefs may not be as productive as natural reefs because they lack the structural complexity and natural forage base. If recruitment to an artificial reef reduces recruitment to natural habitats where survival and growth are greater, the artificial reef may actually *reduce* the regional production of fish.

The industry's desire to leave deepwater platforms in place would set a significant precedent. Even in the Gulf of Mexico, where some platforms are disposed offshore, the platforms are first removed and the sites are completely cleared of debris. The platforms are then deposited in an approved area. Also, in the Gulf of Mexico, the states assume liability for the rigs once they are deposited offshore.

In conclusion, there is no evidence that offshore disposal will have any beneficial impact; whereas there is ample evidence that platform debris creates environmental degradation and safety hazards. Existing policy and permits should be enforced to require complete removal of offshore platforms. If it was feasible to put the platforms in, it must be feasible to take them out. The oil companies knew all along that the platforms would have to be removed and should not be relieved of their obligations now that their production operations have ceased.

PLATFORM ABANDONMENT AND THE SANTA BARBARA CHANNEL

NICHOLE CAMOZZI
Intern, Environmental Defense Center, Santa Barbara

Between 1958 and the 1980s, thirty-one platforms have been installed in the Santa Barbara Channel. Production on some of these platforms is now complete and the platforms must be removed. The first four of these platforms were removed in 1996 from state waters off the coast of Santa Barbara County, raising the issues of platform abandonment options and impacts. When removing a platform, a myriad of options arise, raising the question of which is "best" for all parties involved. Environmental groups, commercial and recreational fishers, state and federal agencies, and the oil industry must choose the most feasible economic and environmental option while not violating any permit conditions or laws. Although current state and federal regulations require complete removal of the rigs, the full range of options are as follows:

1) Complete removal
2) Use of platform as scrap onshore
3) Rigs-to-Reefs program converting platform pieces to "artificial reefs"
4) Sell in place to other oil company
5) Relocate the platform for use elsewhere in the ocean
6) Store the platform onshore for possible reuse
7) Partially abandon the platform in place by either cutting it off below the water line ("topping") or tipping the platform over ("toppling")
8) Leave in place for research, recreational fishing, restaurants, etc.
9) Deepwater dumping

The current debate focuses on whether to completely remove the platforms or whether to convert them to "artificial reefs." The Environmental Defense Center, on behalf of local environmental organizations and commercial fishers, supports the option of **completely removing** the platforms in compliance with state and federal permit conditions. Another goal of the above parties is restoration of the marine environment to its natural state.

For 20 years, the Environmental Defense Center (EDC) has been working to protect the California coast from oil development, the catharsis of which comes in complete removal of the oil platforms. Additionally, 40% of fisheries in the Santa Barbara Channel have been lost to the oil industry and the commercial fishers feel it is only just for the oil companies to restore this region. The permitting state and federal agencies apparently agree. However, there is a current effort to modify government regulations to circumvent complete removal by focusing on a "rigs-to-reefs" option.

The scientific argument surrounding the issue of platform abandonment, namely "rigs-to-reefs," centers on the need to study each area around a platform to determine if an artificial reef is necessary and whether a platform is suitable to act as a reef. Additionally, the Department of Fish and Game (DFG) does not consider an area that fish use merely as a refuge to be an artificial reef. According to the DFG's "Guide to Artificial Reefs in Southern California," the primary factor of consideration for an artificial reef is the following:

> "Reefs must provide adequate habitat for shelter, forage, growth, and reproduction, thereby increasing (regional) fish production. The goal of reefs is to increase species' carrying capacity." (p. 5)

Each artificial reef is unique; therefore to determine an artificial reef's effectiveness, each reef must be studied individually. More importantly, platforms are not the most desirable materials or design for artificial reefs, and natural reefs already exist in the area. According to an article by Marine Ecologists Dr. Mark Carr and Dr. Mark Hixon, titled "Artificial Reefs: The Importance of Comparisons with Natural Reefs," "… the greater vertical relief and shelter availability (number of holes) of artificial reefs did not

compensate for the great structural complexity (variety of hole sizes) and natural footage base provided by the corals and associated benthos of natural reefs." (p. 3) There are both shallow- and deep-water natural reefs in the area of the Santa Barbara Channel, such as Carpinteria Reef, Horseshoe Kelp, Horseshoe Reef, and Four-Mile Reef. Therefore the urgency for artificial reefs in the Santa Barbara Channel is not imminent. In fact, artificial reefs may attract fish away from more effective natural reefs. Permit conditions for complete removal of the platforms should be enforced immediately.

The participating agencies on the state level are the State Lands Commission (SLC), California Coastal Commission (CCC), and the DFG. The SLC and CCC act as permitting agencies which both require the complete removal of platforms including removal of all debris on the seafloor (see, for example, SLC, Negative Declaration, Section 15073 CCR and Final Mitigation Monitoring Program; CCC Chevron 4-H Platform Abandonment, CDP No. E-94-6). The DFG acts as an advisory agency on issues such as whether the rigs should be used as possible artificial reefs.

On the federal level, the Army Corps of Engineers (Corps), Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and the Minerals Management Service (MMS) have jurisdiction over platform issues on the Outer-Continental Shelf (OCS). The Corps' permitting power is granted under the River and Harbor Act, Section 10, which regulates work on structures in or affecting navigable waters of the United States. In accordance with the SLC and CCC, the Corps also requires removal of debris on the seafloor (see, Special Conditions for Chevron's Platform Abandonment 94-50801-TAW). The EPA shares responsibility with many of these agencies in overseeing air and water quality issues, along with hazardous waste and toxic substance management. The NMFS has jurisdiction under the Endangered Species Act to manage species and marine mammals. And the MMS oversees leases and approves all development of oil and gas on the OCS.

All of these federal agencies, under the lead of MMS, currently require complete removal of oil platforms. Politically though, the MMS appears willing to support rigs-to-reefs. The Environmental Defense Center, local environmental groups, and fishers would like to see state and federal agencies enforce their own permit requirements by expediting complete removal of platforms when production has ceased.

Complete removal of the oil platforms is also necessary for liability issues. Aside from the obvious polluting environmental impacts of dumping rig debris in the ocean, who is responsible when this material deteriorates? What happens when platform pieces become navigational hazards? Who pays for new fishing gear when commercial fishers snag their nets and possible capsize their boats, thus endangering lives? The safety precautions that must be taken if platforms are left in the ocean are numerous. Complete removal of the platforms is the only feasible option; it is cost effective, environmentally sound, and safe.

The State Lands Commission, the leading state agency on oil platform issues, allows construction of platforms on the condition that upon completion, the oil industry must "restore the marine environment to its natural state." (SLC Negative Declaration, Chevron 4-H Platform Abandonment, Section 10573 CCR and Final Mitigation Monitoring Program, p. 5-107.) "Natural state" means absolutely no presence of a rig or rig debris. It is time to restore the Santa Barbara Channel to the pristine environmental conditions before 1958, when fishers and recreationalists could roam freely and our sea floor was clear.

SHELL MOUNDS

NICHOLE CAMOZZI
Intern, Environmental Defense Center, Santa Barbara

In 1996, Chevron removed oil platforms Heidi, Hilda, Hazel and Hope off the coast of Southern California near Summerland and Carpinteria, leaving behind massive mounds of mussel shells. The mounds, approximately 200 feet wide and 20-30 feet tall, have accumulated as a result of periodic scrapings of the initial platform legs. Although the platforms are now gone, the issues arises over what to do with these shell mounds. Who is responsible? Who enforces decisions? What are the options? Local fishers, community environmental groups, and state and federal agencies are currently trying to answer these questions. As a result, unenforced permit requirements, ambiguous guidelines, and confusion have surfaced.

The involved parties include both commercial and recreational fishers, the Environmental Coalition of Santa Barbara (Sierra Club, League of Women Voters of Santa Barbara, and Citizens Planning Association), The Environmental Defense Center (EDC), the State Lands Commission (SLC), the California Coastal Commission (CCC), the Army Corps of Engineers (Corps), the Department of Fish and Game (DFG), and of course, Chevron. The commercial fishers (mostly trawlers), along with the environmentalists, would like to see the shell mounds removed immediately due to the hazards the mounds pose to the livelihood of fishers. Fishers feel the threats of snagging gear and capsizing boats endanger not only their property, but their lives as well. Restoration of the marine environment to its natural pre-oil industry state is also a main concern of the trawlers and environmentalists. On the other hand, the recreational fishers and the mussel harvesters believe that the shell mounds act as artificial reefs which provide ideal fishing grounds. The conflicting agendas of the commercial trawlers and the Environmental Coalition, versus the recreational fishers and the mussel harvesters, cannot be resolved without guidance from both state and federal agencies.

The SLC and the CCC are the state agencies (Chevron's four platforms are in state waters within the three-mile jurisdiction) whose permits require the removal of all debris on the seafloor, as well as a trawl test and verification of site clearance (SLC, Negative Declaration, Section 15073 CCR and Final Mitigation Monitoring Program; CCC Chevron 4-H Platform Abandonment, CDP No. E-94-6). Chevron flunked both agencies' trawl tests. The Corps (the federal agency) also requires removal of debris within a 1,000 foot radius and "Preparation and execution of a 'trawl plan' providing the test trawls of the area, and survey of the project area with a ROV high resolution side-scan sonar to **verify that potential hazards to commercial fishing operations have been removed**" (Corps, Special Conditions for Chevron's Platform Abandonment 94-50801-TAW). Chevron did not pass this trawl test either.

The State Lands Commission and the California Coastal Commission are looking to the Department of Fish and Game for advice on this case, specifically to answer whether there shell mounds act as artificial reefs. According to the DFG's "Guide to Artificial Reefs in Southern California," the primary factor of consideration for an artificial reef is the following:

> "Reefs must provide adequate habitat for shelter, forage, growth, and reproduction, thereby increasing (regional) fish production. The goal of reefs is to increase species' carrying capacity." (p. 5)

Two marine biologists at the University of California Santa Barbara's Marine Science Institute have recently studied artificial reefs and shell mounds. Dr. Milton Love, one of the scientists, has studied the mussel mounds surrounding platform Gina (east of the Santa Barbara Channel) and does feel that fish reside in the area. Although Milton Love was cited in the SLC's Negative Declaration on the Chevron Platform Abandonment Project as finding the area of the platforms "not suitable for many rockfish species" (p.5-55), he does

feel that even if fish just use an area for a refuge, that refuge can preserve the species' life, thus indirectly increasing carrying capacity.

Dr. Mark Carr, a former UCSB Marine Ecologist now working at UC Santa Cruz, has published journals on artificial reefs and feels that each artificial reef is unique. To determine a reef's effectiveness, Carr states the reefs must be studied individually. Because the mussel mounds being discussed have not yet been researched, Carr is hesitant to assert or deny the mounds' performance as an artificial reef.

This lack of information leads right back to the DFG investigation of the mussel mounds' role as possible artificial reefs. The DFG feels it is Chevron's responsibility to conduct video reconnaissance of the mounds for DFG to evaluate and determine the role of the mounds. If the DFG decides the mounds are artificial reefs, the SLC and CCC will most likely concur. This means if Chevron would like to leave the mounds in place, they will have to seek amendments to their permit requirements. In the process of seeking this amendment to forego the permit-required "trawl-test," Chevron will have to undergo supplemental environmental review which includes public review and comment. Additionally, the question remains regarding responsibility for damage incurred by trawlers' gear from the mounds. Will Chevron be liable and continue to pay for new gear or will the SLC take over responsibility if the permits are amended?

EDC Shell Mound Removal

In the meantime, the Army Corps of Engineers has decided that although Chevron flunked the Corps' trawl test, the shell mounds are not an issue because the Corps considers shell mounds "natural" and not "debris." This may lead one to inquire what exactly defines "debris," considering the mussel mounds resulted from the presence of the oil rigs. According to the Army Corps' Environmental Assessment of this project, "debris" is referred to as "… all man-made obstructions (e.g., pieces of the topsides, jacket and equipment used during the operation)…" (p. 12). This presents a problem for all parties involved if the Army Corps is not willing to recognize 200 feet wide, 12-30 feet tall mussel mounds which formed after being chipped off oil rigs as "debris." As far back as 1987, the Minerals Management Service (another federal oil permitting agency) clearly recognized the mussel mounds as "debris" in a study titled "Ecology of Oil/Gas Platforms Offshore California." Numerous times throughout the report the mussel mounds were mentioned as "debris" or "debris pile(s)" under the platforms (pp. ix. 17, 19-20). More importantly, the Army Corps' permit contains the additional requirement that all potential hazards to commercial fishers must be removed. These mounds **define** potential hazards to commercial fishers. The Corps may not ignore this fact, choosing to enforce only the portion of its permit requiring debris recovery of strictly man-made materials.

With the Corps neglecting the fact that mussel mounds interfere with commercial fishers and the DFG waiting for Chevron to eventually video the mounds for further study, the commercial fishers and the Environmental Coalition are disconcerted. Claims have already been filed by fishers for damaged nets, tensions are mounting due to the unenforced permit requirements, and almost a year has passed since the platforms have been removed, making the mussel mounds a pressing issue. The people with the most at stake, the trawlers and environmental groups, are tired of being in limbo.

The State Lands Commission's Negative Declaration seeks to "restore the marine environment to its natural state" (p. 5-107) and that is what the Environmental Defense Center is asking of Chevron. Although studies need to be done to determine whether these mounds do serve as artificial reefs, there already exist many natural reefs in the area. Removing the mounds will not be detrimental to the regional fish population considering the presence of many nearby natural reefs. Sending a message to oil companies that they must clean up our coast when they are done extracting their profits is the most vital issue in this case. Oil rigs were allowed on the condition that complete removal would follow the end of a rig's presence, in this case this shell mounds. It is time to force Chevron to promptly abide by its permit requirements.

OIL AND GAS INDUSTRY PERSPECTIVE REGARDING ENVIRONMENTAL EFFECTS DURING DECOMMISSIONING

DAVID TYLER
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It's a distinct honor to address this workshop on oil and gas facility decommissioning. It is also a pleasure to be back in the Tri-county area and again renew long friendships with many of you.

Before I begin, I want to commend the Minerals Management Service, the State Lands Commission, and the other local agencies and interested parties for their proactive and continuing attention to the decommissioning issue. It's one of the important issues facing offshore and even onshore oil and gas production in California during the next decades.

While I am representing the oil and gas industry today, I will be referencing one recent decommissioning experience associated with Exxon's Santa Ynez Unit or SYU development. This experience was the successful, as it turned out, decommissioning of the Offshore Storage and Treatment facilities, or OS&T for short. And I say "successful" thanks in large part to the expertise and dedication of many individuals and organizations too numerous to name -- but well represented at this workshop -- including regulators, contractors, consultants, and fisheries reps. By the way, if you have not already visited Exxon's exhibit, I encourage you to take a look at the pictures of some other recent SYU decommissioning projects.

With that said, I have been asked to give an oil and gas company perspective regarding the environmental effects during decommissioning and removal operations. You have already heard what the effects might look like for air quality, fisheries, marine mammals, and other resources. I would like to talk about three ingredients that are absolutely essential, in our view, to a positive environmental outcome, and which apply regardless of the resource or disposition option.

The first ingredient is sound science. This applies as much to the prospective industry applicant wanting to decommission a facility as it does to the regulators. The analysis and resulting regulatory decision should be based on the best available science, taking into account human safety, technical feasibility, environmental benefits and risks, and cost-effectiveness principles. Consultants and marine contractors obviously play an important role here. For instance, their expertise was vital in helping Exxon generate accurate vessel emissions forecasts and project durations for the OS&T decommissioning project. This information was used by Exxon and the agencies to rationally compare abandonment alternatives during the NEPA permitting process.

The second ingredient is removal flexibility. Each offshore facility is site-specific and all disposition options need to be considered before making any decisions. This includes the ocean disposal option. Conversely, a rigid "one size fits all" regulatory policy sometimes results in greater environmental impacts, inefficient use of capital resources, and may even dampen technological innovation.

Flexibility is also important in how the job is performed. For example, Exxon was able to avoid explosives during OS&T pile removal operations because it had the flexibility to cut the support piles as shallow as two feet below mudline, if necessary. As it turned out, the abrasive cutting method worked fine and the piles were cut about 15 feet below mudline. The point is, the agencies built-in the flexibility up-front to respond to actual seafloor conditions so that we could pursue the optimum solution.

The last ingredient is open communications. I cannot emphasize enough the importance of open dialogue with all jurisdictional agencies and affected groups with legitimate concerns, including non-jurisdictional agencies and other ocean users like fisheries. Of course, this

dialogue needs a strong lead agency to keep the process moving forward efficiently. MMS, as the lead agency for the OS&T decommissioning project, did a superb job in getting all the agencies together with Exxon early and often to discuss issues and options.

Exxon also communicated openly and widely throughout the OS&T permitting process. We did not wait until the work barges were offshore to discover whether there were any potential conflicts. For example, Exxon consulted early in the process with the joint oil fisheries liaison office. Letters were also sent to potentially affected commercial fisheries soliciting their comments and suggestions. From this information, a plan acceptable to all parties was worked out to minimize any impacts. Moreover, prior to and during the operation, notices to mariners were broadcast by Coast Guard radio and, just in case, notices were posted at harbor master offices to keep fisheries informed during decommissioning.

In summary, I believe these three ingredients--sound science, removal flexibility, and open communications--are essential to a positive environmental outcome for all concerned. That certainly was the case for Exxon's OS&T project.

POSITION WITH RESPECT TO THE DECOMMISSIONING OF OFFSHORE OIL PLATFORMS

MERIT McCREA

Owner/Operator of Seahawk LXV
Representative for Southern California Commercial Passenger Fishing Vessel Industry
Board Member of the Sport Fishing Association of California

It is my feeling that platform jackets be left *in situ* in the fashion that meets the requirements for both safety and safe navigation. Of the options covered in the Workshop and in order of preference after considering the technical considerations involved and the points brought forward by other speakers at the Workshop these would be most suitable for my user group.

1. Alternate use in conjunction with "Moth Balling" where safe and practicable pending market shifts or technological advances that might make renewed oil and gas production efforts viable. It is interesting to note that some of the services to the navigational community in conjunction with the current operations may be worth while enough to justify the continued maintenance of a particular platform. e. g., Harvest Traffic Center's supervision and vigilance over the Western terminus of the Santa Barbara Channel Vessel Traffic Separation Scheme. Weather reports and observations on site provided to NWS and rebroadcast to the public.

2. Partial removal with a portion of the Jacked left above water to support lighting and sound equipment to make its position evident to mariners.

3. Topping the jacket below a level that assures safe navigation of vessels typical to the area and conceivable for the future.

Key to all of these options is that both part of the cost savings to be realized by these less than complete removals and the scrap materials being made available to be used toward environmental enhancement of the local coastal area and continued maintenance of the remaining site.

It is the specific interest of my user group that the jacket structures continue to act as recruitment and/or production sites for the fishes that use them currently. These rig structures have historically been the site of good sport fishing opportunities for our clientele at times. We would hope that they would continue to be so. Enhancements of other nearby areas resulting from the deposition of scrap materials of the decommissioning process and made economically possible by cost savings in the decommissioning process would be an additional plus for us. If it is the position of the Ca. DFG that additional types of materials be used in conjunction with the scrap steel that too would be supported by us.

I. Sport fishing is important
II. Reefs are important to sportfishing
III. Platform based reefs would be a good thing for sport fishermen

I. Sport fishing is important

1) Outdoor Life network mentioned that sport fishing was surveyed to be the second most popular sporting activity nation wide.
2) I spoke with Bob Fletcher and he noted that we had carried 550,000 ANGLERS industry wide last year.
3) There are over 300 CPFVs currently operating in California.
4) He also mentioned that Mr. Steve Crook of DFG had noted that as of 1995 there slightly more private boat anglers than CPFV anglers for the first time.

5) Sport Anglers do lots of stuff besides fish along the way…

    Eat at Restaurants
    Buy boats and tackle
    Incur travel expenses
    Stay in hotels
    Pay for fees and licenses

Are members of the public and have opinions…

6) Sport fishing is important.

II. Reef structures are important to sport fishing

1) From a local party boat perspective much of our fishing occurs over hard substrate, reefs:

    Kelp bass
    rock fish
    much of yellow tail
    much of white seabass
    much of barracuda
    much of Sand Bass
    Sculpin & some tuna

2) I Spoke with Russ Izor about his reefs. He was instrumental in the construction of 17 artificial reefs in the Newport area. Apparently, there are times when these reefs provide the best/only sportfishing opportunity for the **Newport ¾ and ½ day boats**.

3) They produce literally thousands of sculpin at times when water conditions are such that other fish aren't biting. **"The Newport boats have lived off it."**

4) He noted that key in reef productivity was the use of a dump barge where materials are dumped on top of one another instead of scattered thinly over a wider area. **(high relief).**

III. Platforms make good sport fishing sites

1) The areas that the rigs are located even in the channel area lack high relief structure also. None greater than 4 m and mostly less.

*= lost opportunity

2) In '87 and '88 Herman* First desire to have left in place as reef.

3) In '89, '90, '91 and on Hazel,* Hilda,* Hope,* Heidi,* Houchin, and Hogan.

4) In the late 70's Widows on ABC Hillhouse.

5) Also Bocaccio on Holly.

SANTA BARBARA LOBSTER TRAPPERS PERSPECTIVE RIGS-TO-REEFS POSITION PAPER

CHRIS MILLER
Santa Barbara Lobster Trappers

We believe that the introduction of artificial reefs in our area should have well defined goals. Our goal for artificial reefs is that they are designed to promote the growth of the kelp forest ecosystem. We find that the current concept of rigs-to-reefs for decommissioned oil platforms is biased in its focus of providing sport fishing opportunities for one species, rock fish. We wish to promote a more holistic goal for artificial reefs.

As commercial fishermen we view the loss of our coastal kelp forests with the same alarm that land based environmentalists view deforestation. The kelp forests and bottom growth of various marine algae provide habitat that plays a major role in the life cycles of the majority of our coastal marine life. We suggest that artificial reefs be composed of appropriate materials and placed inside sixty feet to promote kelp forest ecosystems. We also would like to see these artificial reefs placed in relationship to existing reef habitat to enhance and expand them.

The Santa Barbara Lobster Trappers oppose all artificial reef proposals that conflict with traditional fishing methods in historic fishing grounds of the Santa Barbara commercial fishing community.

SOUTHERN CALIFORNIA TRAWLERS ASSOCIATION PERSPECTIVE

1) ENVIRONMENTAL ISSUES

A. Area Preclusion.

During rig removal, trawl fishermen lose additional fishing area due to the deployment of barges, moorings, support craft and related equipment. This causes an economic impact that should be mitigated.

B. Fishery Impacts.

Underwater abandonment activity – especially detonations that break up legs or oil rigs – scatter fish such as halibut, a primary species targeted by local trawlers. Not only does this decrease our ability to catch fish near the rigs, experiences in fisheries impacted by seismic blasting suggest that, depending on the species and duration of sonic disruptions, this phenomenon can last several weeks. In deep water, species affected could include commercially-harvested rockfish, sole and shrimp. Economic impacts could range from moderate to severe, and should be mitigated.

C. Recommendations.

Oil companies should communicate with fishermen prior to start-up of abandonment operations, in order to 1) schedule and undertake activities in a manner that creates the least amount of impact to trawlers; 2) deploy barges, moorings and other equipment in areas where trawlers would not fish anyway (such as hard bottom rocky areas), thus reducing the amount of area preclusion; 3) coordinate abandonment activities with seasonal or area fishing closures, in order to best accommodate commercial fishing activities; and 4) notify fishermen about the timing, progress and results of all abandonment activities, including detonations and seafloor cleanup. Oil companies should also develop a system for day-to-day communication with fishermen, in order to alert them to which areas are clear for trawling and which might present hazards, depending on abandonment operations. Mitigation for economic losses due to area preclusion and fish dispersal during abandonment should be implemented.

2) DISPOSITION ISSUES

A. General Comments: Removal vs. Non-Removal.

Based on permits issued by the Army Corps of Engineers, State Lands Commission, Minerals Management Service, California Coastal Commission and Santa Barbara County, fishermen have been led to believe oil rig “abandonment” would mean complete removal of the rigs and restoration of the ocean floor to pre-development conditions. Negotiations and mitigation measures have been undertaken based on that understanding. As the abandonment process draws closer, however, concepts such as “rigs-to-reefs,” which would preclude total abandonment, are receiving increased attention. The following comments are based, to a degree, on that perception or possibility.

B. Recommendations.

Oil rigs should be completely removed during the abandonment process, as required by permits the companies signed years ago. This perspective is shared by many other fishermen’s groups, including the California Lobster and Trap Fishermen’s Association and Pacific Coast Federation of Fishermen’s Associations, which are on record in that regard. Once rigs are removed, the seafloor should be restored to its natural state. That means removal of all debris, including shell mounds. If the mounds are left in place, trawlers lose an area even greater in size than the area lost when the rigs were operating. Without benefit of sophisticated Global Positioning Satellite (GPS) navigation and plotting devices (which most local trawlers do not have), they cannot risk fishing anywhere near the mounds, due to the possibility of damaging or losing gear, damaging their boats and endangering their crews. Recent data supports this perspective. In June 1997, for example, halibut trawlers from several ports – including Santa Barbara and Morro Bay – fishing near the abandoned “4-H” rigs repeatedly snagged and severely damaged their gear on shell mounds. They also caught tires, chains, steel pipes and chunks of cement in areas that were supposedly clean

and ready for fishing. Remaining pipelines do not pose a particular threat to trawling, as long as they are sufficiently buried. Pipeline connections, however, must be shrouded (covered), removed or well-buried to avoid snagging trawl nets. This has been a problem with abandoned rigs and pipelines in the past.

C. Other Considerations.

If the rigs are not removed, SCTA would prefer that they be left in place with superstructure protruding above the waterline, so their exact location can be determined without GPS plotters. In addition, mitigation for the continued loss of fishing areas and the continued presence of subsea hazards (including commensurate economic impacts) should be considered. If the rigs are left in place, SCTA also has the following, specific concerns:

1) For environmental protection and protection of the boating public, some agency, private party or association must accept liability for corrosion of remaining rig materials and their dispersal through the water column of along the seabed. "Rot" and "reef" are two different concepts. In addition, some entity must accept liability for potential harm to commercial fishing boats, their gear and their crews, should fishermen snag rig structures or debris associated with the rigs, or be harmed by pieces of rigs that dislodge themselves and cause "offsite" impacts.

2) The superstructure of at least one rig should be modified to accommodate weather-sensing and weather-reporting equipment. This project would benefit all mariners, especially since individual offshore weather buoys are temporary. Offshore rigs dismantled in the southern Santa Maria Basin (western end of the Santa Barbara Channel) would be good candidates for this project The rig chosen for a weather station should be selected by consensus among representatives of the fishing community, National Weather Service, and the Scripps Institution of Oceanography.

3) The location of any rigs dismantled below the waterline must be marked above the water line. In other locales, attempts to mark the location of artificial reefs with spar buoys have proven difficult, since, over time, the buoys grew heavy with marine growth and eventually sink. Thus, a maintenance contract (with funding identified and secured beforehand) and a maintenance schedule should be completed before any rigs are turned into artificial reefs. The agreement should cover the reef itself, plus any apparatus used to mark the site for mariners and fishermen. To avoid posing hazards to navigation, buoys marking artificial reefs should include radar reflectors and strobe lights. If concern arises over the fact that a highly-visible, well-lit buoy will attract too many sportfishermen and result in the take of too many fish (possibly drawn to the area from nearby hard-bottom habitats), then the artificial reefs should not be established in the first place. Safety is a primary consideration of all options, should the rigs – in whatever form or at whatever depth – remain.

4) Full environmental review should be undertaken before rigs are turned into reefs. This study should review potential impacts to several commercial fisheries, including bottom trawlers, swordfish and shark drift-netters, salmon trollers and hook-and-line rockfish fishermen. Participants in these fisheries have anticipated full removal of offshore platforms, and all would be impacted in various manners and to various degrees, should a "rigs-to-reefs" plan be implemented.

UNITED ANGLERS OF SOUTHERN CALIFORNIA / AMERICAN SPORTFISHING ASSOCIATION PERSPECTIVE

DANIEL FRUMKES

Chairman, Habitat Research and Enhancement Committee, United Anglers of Southern California (UASC)
Director, Conservation Network, American Sportfishing Association (ASA)

A. Air Quality

The less time that heavy equipment must be employed during decommissioning the less air quality will be negatively impacted. The cost of complete removal of the five platforms under discussion has been estimated to total several hundred million dollars. Partial removal will result in savings of millions of dollars. Chevron is willing to share savings derived from using the platform jackets as part of a Rigs To Reefs program. This provides an unprecedented opportunity for habitat enhancement. Environmental effects of decommissioning including air quality should receive primary attention. Next, we would like to see that maximum funding is made available for artificial reefs. This will be enabled by maximizing the shared savings, and will probably result from finding an alternative use for the platforms or "topping" them, i.e., removing the topsides and cutting the jackets at a safe depth.

The effect on air quality became a major issue in the recent decommissioning of the 4 H rigs near Carpinteria. Our solution involved topping the rigs and would have reduced the air pollution and enabled improved marine habitat. Unfortunately the minority position held by special interests prevailed and the environment suffered.

B. Commercial/Recreational Fisheries

Commercial and recreational stakeholders fish and dive close to the platforms and exposed pipelines because their productivity results in increased concentrations of marine life. The decommissioning process should be safe and take reasonable care to avoid harming mammals and causing chemical pollution. Otherwise it should proceed rapidly so as to minimize the disruption of fishing and diving. The appropriate regulatory agencies have expertise in these areas and we are available to support and assist them.

We would like to see both environmental protection and maximum funding made available for artificial reefs (see A. Air quality). This will be enabled by maximizing the shared savings and probably involve finding an alternative use for the platforms or topping them, i.e., removing the topsides and cutting the jackets at a safe depth. Since "time is money", solutions designed to safely maximize savings will probably tend to minimize the time that fishing activities are disrupted.

C. Marine Mammals

The less explosives and the less time that heavy equipment is employed during decommissioning, the less that marine mammals will be negatively impacted. The appropriate regulatory agencies have expertise in the appropriate measures to protect marine mammals and we are available to support and assist them. We would like to see both environmental protection and maximum funding made available for artificial reefs (see **A. Air Quality**). This will result from maximizing the shared savings, and will probably involve finding an alternative use for the platforms or topping them at a safe depth. These solutions are also in the interest of marine mammals.

D. Marine Benthic Impacts

Given proper attention to the environmental concerns discussed above, the disturbance of the benthos should be minimized. Since scientists believe that the productivity of the jacket remaining after decommissioning will be enhanced by the addition of non-toxic hard substrate. Leaving as much as possible of what is already there should be of benefit the marine environment.

Mounds of shells produced by invertebrates living on the jackets have accumulated at the base of rigs. Scientists believe that shell mounds provide productive nursery habitat. The ones at the base of the 4 H rigs measure

hundreds of feet across and up to 30 feet high. Although the trawlers are currently demanding that the remaining shell mounds be removed, the state and Chevron are planning to evaluate their habitat value. The trawlers have offered to contract to remove the mounds. They have also suggested that they might allow these productive reefs to remain, provided that the fishers are adequately compensated.

Clearly the mounds associated with the platforms currently being evaluated should not be removed if they are enhancing the productivity of the marine environment. Factors to consider include: (1) the productive value of the mounds, (2) potential habitat enhancement from redirected funds, and (3) the avoidance of negative environmental impacts associated with the removal of these large mounds.

See section K, (Enhancement of the Platform Structure) for a more complete discussion of the value of allowing hard substrate to remain and be enhanced.

E. Water Quality

Environmental effects of decommissioning including water quality should receive primary attention. Next, we would like to see that maximum funding is made available for artificial reefs. This will result from maximizing the shared savings, and will probably result from finding an alternative use for the platforms or topping the jackets at a safe depth.

Decommissioning solutions that require removal of the subterranean portion of the legs could increase the possibility of seepage. However, the plugging mechanisms we and the agencies support make this unlikely. The removal of pipelines poses risk of contamination and will have to be reviewed on a case by case basis. The appropriate regulatory agencies have expertise in the appropriate criteria and measures to protect the environment from adverse effects to water quality we are available to support and assist them.

F. Contamination/Remediation of Onshore Sites

Some of these sites may have potential value to recreational fishers (see **G. Future Land Use).** Also, some of the non-toxic materials to be removed may be better utilized as productive marine habitat than added to already crowded landfills. We would like these issues considered when solutions are chosen.

G. Future Land Use

In 1992, recreational fishing contributed $2.9 billion in sales to the California economy and generated a value added impact of nearly $5 billion while supporting 153,849 jobs. For the same year, the value added impact of the commercial fishing industry was only 0.7 billion and supported 20,820 jobs. The federal government estimated marine anglers' expenditures in southern California to be $536 million for 1989. Most of this was related to shore or near shore based angling. Marine anglers make a far greater contribution to the economy than do commercial fishers, yet do so while taking a much smaller proportion of the state's marine resources. The value of recreational fishing should be considered when determining the use of piers and other coastal sites.

H. Commercial Fishing

The halibut and other fisheries impacted by trawls would benefit, over time, if more of the sea floor was protected from these nets. State tidelands were closed to trawlers near the turn of the century to protect habitat and reduce over-exploitation and waste. Some of the waters were reopened in 1971 by the state Legislature in an effort to save the trawlers from the financial effects of depleted halibut stocks. The expansion of the trawling area had the potential of further depleting those stocks and was supposed to be temporary, pending an evaluation. The state's evaluation concluded that, given the dramatic increase in pressure on the halibut stocks, the expansion of the halibut trawl grounds further exacerbated the over-exploitation. The trawl fishery for the sea cucumber, a prized invertebrate in Asia, was initiated, in part, to compensate for reduced halibut stocks. Sea cucumbers are easily over-exploited, and they have been elsewhere. Local over-exploitation is also expected.

Trawlers fish near the rigs because fish congregate there. The least beneficial structure, from the trawler's viewpoint, include small unmarked pieces of debris. Although these act as mini-reefs, they do pose a problem for trawlers because trawls are not very selective. They catch debris in addition

to a large bycatch of unwanted marine life. It is precisely this characteristic of bottom trawls that causes them to damage natural habitat. Habitat damage is one of the reasons that trawls have been banned in state waters.

Trawlers who use other fishing gears have attempted to persuade other commercial fishers to oppose the Rigs to Reefs program despite the advantages provided by the reefs. As a result of conflict with the oil companies, the trawlers have demanded and received money and equipment. Fishers, other than trawlers, may support them based fear that they will be negatively impacted as the public reacts to local over-exploitation. Their insecurity has increased due to public awareness that most of the world's important fish stocks are depleted, and that over-exploitation driven by an exploding population is a primary cause. It is natural for them to feel a need to band together to protect their freedom. However, it is not in their interest to join the trawlers because most of the local fishers are not deserving of the criticism directed at the trawlers. We want to work with them to optimize the resource enhancement potential of Rigs to Reefs.

The influence of the trawlers is out of proportion to their small numbers. They have received millions of dollars in compensation from the energy industry by blaming the industry for diminished catches. The trawlers capitalized on the industries' unpopularity and the lack of public awareness that over-exploitation was the primary cause for reduced trawl landings. Recently, they were instrumental in defeating a plan to use of the 4 H rigs in a habitat improvement and research program. They not only demanded that the rigs be removed, but some also demanded to be reimbursed for lost fishing opportunity during removal. The trawlers currently are demanding that the remaining shell mounds be removed and have offered to contract to remove them. Scientists believe that shell mounds provide productive nursery habitat, therefore some trawlers have suggested that they might allow the mounds to remain provided that the fishers are adequately compensated.

The influence of the trawlers has been enhanced because they are represented by the Environmental Defense Center. We were told that this organization is supposed to work for the protection and enhancement of marine resources. This goal is not furthered by supporting those who damage and over-exploit marine resources or by opposing resource enhancement programs.

I. Recreational Fishing

We represent southern California's largest conservation organizations dedicated to increasing the value of marine resources to the citizens of California. Increased abundance of marine fishes and invertebrates is essential to achieve that end, and artificial reefs can be very beneficial. We believe that the design and management of reefs should be based on the best available science.

Our dedication to improving habitat has been established. We have provided most of the funding for California's artificial reef program since its inception in 1958. With the reduction in government funding, most recent construction has been accomplished due to our initiative and with donated funds. The cost of complete removal of the five platforms under discussion has been estimated to total several hundred million dollars. Partial removal will result in savings of millions of dollars. Chevron participates in the Rigs To Reefs programs in states bordering the Gulf of Mexico. There, 50 percent of the savings realized by using the rigs in the program are dedicated to marine habitat enhancement. We are committed to working with responsible agencies and industry to ensure that funding for the enhancement of nearshore coastal habitat is maximized as a result of an environmentally sound decommissioning process.

Reefs are beneficial to anglers and divers as well as to commercial fishers, because they produce and aggregate marine life. Fishers using stationary gear such as most anglers, commercial hook and line, and commercial trap fishers concentrate their efforts near reefs. Even mobile gear fishers such as halibut trawlers drag their nets close to reefs because halibut concentrate there. Tall complex structures such as the bottom of platform jackets are good to fish near but can entangle fishing gear which is dragged across them. This is one reason that scientists have suggested that the jackets be left in place as harvest refugia. Anglers would support harvest refugia as one of several alternative management concepts for artificial reefs.

Anglers are working to implement management that restores fish stocks to levels that produce the maximum sustainable surplus. We fund and provide volunteer staff in experimental mariculture facilities in an effort to rebuild depleted stocks and to learn more about our marine resources. Artificial reefs can function as habitat for mariculture. Indeed, platform jackets are presently so utilized. Mariculture offers the potential of enabling the over-capitalized segments of the commercial industry to move from ***capture to culture*** by raising marine life instead of further depleting existing stocks. We want to maximize the value of stocks to society while we work to maximize the quantity of important marine resources. Improved habitat and management are essential to attain these objectives.

We would like to see that the maximum funding is made available for artificial reefs. This will result from maximizing the savings shared as part of a rigs to reefs program and will probably involve finding an alternative use for the platforms or topping the jackets at a safe depth.

J. Habitat Value

Only 5 percent of southern California's shallow marine bottom is hard substrate. Scientists have established that the habitat value of hard substrate is between 6 and 15 times greater than that of soft substrate. In addition, the marine life associated with hard substrate are generally valued more highly than those associated with soft substrate. Even halibut, which are commonly associated with sand bottom, concentrate to feed near hard substrate.

The most productive hard substrate has high relief such as that found in reefs. Also, the diversity of marine life increases with reef height. Since productivity increases with available light, reefs should come as close to the ocean's surface as possible. Kelp enhances the productivity of hard substrate, but it is relatively unproductive in the absence of additional high substrate. Some scientists have hypothesized that an improperly located new reef could interfere with the productivity of nearby reefs. Others have observed that increasing the concentration of reefs can be beneficial by diluting the average rate of exploitation. The siting of new reefs should consider these potential effects.

Artificial reefs have been observed to contain higher concentrations of marine life than natural reefs. The consensus among marine scientists is that, in the absence of exploitation, properly sited artificial reefs increase the productivity and abundance of marine life in our coastal waters. However, both natural and artificial reefs have been over exploited in southern California.

Over-exploitation and effects of urbanization have reduced the abundance of marine life. It is clear that we can partially mitigate for these effects by creating reefs. It is characteristic of productive habitat to attract marine life and predators, including man. Therefore, there is a need to develop management solutions that appropriately balance productivity and exploitation. The issue is not ***if*** reefs should be constructed, but ***how*** they should be designed and managed, and ***where*** they should be sited.

There are many available management options. For example, if the reefs were topped in deep water, it might be best to make the remaining structure a harvest refugia for rockfish. Reefs built in shallow water could have more restrictive bag and size limits than are the current norm. The choice of restrictions will be dependent upon socio-economic as well as biological issues.

Pipelines provide hard substrate and, ideally, should be left in place. Reasonable precautions must be taken to protect the environment from toxins. Trawlers have been provided special gear to enable them to roll over the pipelines.

As a part of the decommissioning process, Chevron has indicated a willingness to fund the construction and monitoring of reefs in an effort to provide answers to the questions relevant to an expanded artificial reef program. We strongly support this approach. However, there is substantial funding currently dedicated to the construction of artificial reefs that could enable the process to begin this year. We urge industry and the regulatory agencies to begin relevant research soon to enable us to be better informed prior to the actual decommissioning. Lets enhance the resource while increasing knowledge about resource enhancement.

K. Enhancement of Platform Structure

The most productive hard substrate has high relief such as that found in reefs. Also, the

diversity of marine life increases with reef height. Since productivity increases with available light, reefs should come as close to the surface of the ocean as possible. Kelp enhances the productivity of hard substrate, but it is relatively unproductive in the absence of additional high substrate.

The consensus among scientists is that high relief increases the diversity of marine life. Biomass tends to increase with the complexity of the structure, while increased complexity of the surface of the structure benefits juvenile stages. Steel structures such as platform jackets colonized by invertebrates provide good surfaces. Scientists also believe that high relief should be supplemented by complex low relief such as that created from piles of recycled concrete. The habitat value of a topped structure would likely be enhanced by the nearby placement of the topped portion of the jacket.

Although we know enough to build reefs that are more productive than the soft structure upon which they are founded, we believe that we could improve our reef building ability given appropriate research. There are many questions concerning the optimal design of the complex low relief component. We believe that it should contain both low and high piles of concrete but we do not know how they should be configured to obtain optimal results. Similarly, we are unsure of the optimum combination of sizes of concrete components. We also need to know more about the movement of marine life between reefs and reef modules. These questions have been delineated in research proposals by leading ecologists and fisheries experts.

There is substantial funding currently dedicated to the construction of artificial reefs that could enable the process to begin this year. We urge industry and the regulatory agencies to expand on the research currently planned so that we will be better informed prior to the actual decommissioning. Lets enhance the resource while increasing knowledge about resource enhancement. Chevron has indicated a willingness to fund the construction and monitoring of reefs in conjunction with the decommissioning process. We strongly support this approach as part of a continuing effort to increase our knowledge in areas relevant to an expanded artificial reef program.

L. Site Clearance

We have established, in other sections, that the marine habitat value, marine life abundance and the society as a whole will receive maximum benefits by maximizing the savings that Chevron has agreed to use for marine resource enhancement. This will probably result from decommissioning program involving: (1) the removal of the superstructure, (2) topping the jacket at a safe depth, (3) locating the topped portion close to the remaining jacket, and (4) augmenting the base of the jacket with recycled concrete.

The site destined to become the low relief reef need only be cleared of toxic materials. Non toxic structures (debris) outside the new reef provide habitat value. These structures also can inconvenience trawlers.. Non toxic structures clearly need not be removed if they are in an area designated as a harvest refugia.

In determining which of the non toxic hard substrate (debris) to remove, the responsible agencies will have to balance public views, the views of scientific researchers, the desires of the trawlers (see **N. Social Impacts**), with the value to other stakeholders and to the marine environment Fishers refer to these materials as “structure” and it has habitat value to some forms of marine life. The least beneficial structure, from the trawlers viewpoint, include small unmarked pieces of debris. Although these act as mini-reefs, they do pose a problem for trawlers because trawls are not very selective. They catch debris as part of a large bycatch of unwanted marine life. It is precisely this characteristic of bottom trawls that also causes them to damage natural habitat. How far should we go to facilitate the use of destructive fishing gear?

We do not believe that the habitat value of small debris is sufficient reason for it to remain. However, the cost of removal and the mitigation that could be accomplished with shared savings will also need to be considered. We look forward to assisting these agencies in their pursuit of solutions that maximize the benefits to the public.

M. Onshore Disposition

The regulatory agencies are experienced in this area and we are available to provide assistance if needed. We would like to help ensure that the public is well informed as to the environmental costs of alternatives.

Creating habitat for marine life is far preferable to adding to the waste in landfills. Moving less material also reduces air pollution. Creating reefs may increase air pollution from tugboats but it reduces air pollution from trucks. Unless the rig is left in place or removed intact, onshore impacts will probably be minimized by topping the rigs and allowing the appropriate part of the top of the jacket to be placed near the topped rig. If the rig is in an unproductive location, the top portion might be moved to a more productive location, such as the edge of a near shore canyon. All rig material could be augmented with recycled concrete to enhance the complexity of the benthic structure. We would like to see the superstructure recycled if at all possible.

Clearly, there are many disposition options that provide positive benefits to society and marine habitat. These should be fully explored prior to approval of options that further tax our landfills. The use of concrete as reef components has the added advantage of reducing the amount of material otherwise destined for landfills.

N. Social Impacts

The debate concerning artificial reefs in southern California has focused on biological questions. The most common issue being: do artificial reefs produce marine life or do they just attract it? There is little doubt in the scientific community that artificial reefs both produce ***and*** attract marine life. Production and attraction are a function of siting and design. However, artificial reefs can increase the availability of marine life to predators, including people. Had the reason for the debate been about maximizing the productivity of the most valued marine resources, we would have increased our efforts to: (1) learn how to design, site, and manage reefs to maximize the production of the most valued marine resources (see O. Economic Impacts) and (2) learn how to balance production and consumption. We have not taken advantage of major opportunities to do so. Some of the reasons for this are discussed below.

California pioneered artificial reef development in the 1950s. The program has been funded by millions of dollars, primarily from the recreational fishing community, and, until recently, was robust. The Department of Fish and Game approved the placement near Palos Verdes of two jackets from oil platforms in 1988. Although the project was consistent with California policy and the National Artificial Reef Plan, the project was viewed as “ocean dumping” by some, and it was canceled with little public discussion.

There are many reasons for opposing the construction of artificial reefs. However they are often disguised and expressed in terms of doubts about reef productivity. The opinion that we should leave the coastal habitat in a natural state, even if altering it could increase productivity, should be expressed directly. Also, reefs concentrate marine life and make it more available to fishers and divers. This is an anathema to those who do not approve of injuring marine life. This opinion is often expressed in terms of reef productivity. Other opinions are related to the energy industries’ poor reputation in southern California. There are those who do not like the idea of the industry profiting by participating in the construction of artificial reefs. There would be little acceptance of the position: “biological productivity be dammed” if industry benefits. Therefore it is often expressed in terms of productivity. For example the use of platform jackets in reefs is precluded by the argument that “the only productive reefs are kelp reefs”. This statement has no factual basis and is contradicted by available research. The bias is illustrated by the relative lack of opposition to the use of a large steel structure in a reef at about the same time that the use of platform jackets was being vigorously opposed..

Artificial reefs are disparaged by some who are concerned that acknowledging the productivity of artificial reefs would inhibit wetland restoration. The logic is that productive reefs might be approved as mitigation for habitat damaged during development, especially harbor development. Although wetlands are of little benefit to the most valued fisheries in southern California, they are valued by most of us. We do not feel that it is appropriate to disparage the productivity of reefs in order to protect wetlands. We prefer a balanced approach that supports both wetlands and reefs.

The **importance** of the attitude toward artificial reefs also varies widely among individuals. The views of stakeholders who frequently interact with coastal waters would be expected to be more strongly held than the views of people who have little contact with

the ocean. We are supporting research to evaluate public attitudes concerning artificial reefs. Such research can provide a framework in which to develop and manage coastal habitat to maximize the value to society.

O. Economic Impacts

In 1992, recreational fishing contributed $2.9 billion in sales to the California economy and generated a value added impact of nearly $5 billion while supporting 153,849 jobs. For the same year, the value added impact of the commercial fishing industry was 0.7 billion and supported 20,820 jobs. The most recent estimate available for annual expenditures by marine anglers in southern California was $536 million during the 1989 calendar year. Most of this was related to shore or near shore based angling.

The value of edible fish and fish products imported into California in 1992 was almost eight times the value of exports. Most of the little remaining seafood caught in our waters is not consumed by Californians. Marine anglers make a far greater contribution to the economy than do commercial fishers, yet do so while taking a much smaller proportion of the state's marine resources. None the less, the value of the marine resources of California is usually expressed as a sum of the number of pounds of each species landed by commercial fishers times the price per pound. This number is doubled or tripled when expressed as the value to the economy.

The value of marine life to the stakeholders varies widely. A few fish are worth a great deal to the non-consumptive diver (snorkel or scuba diver), or catch and release angler. Each fish provides repeated pleasure over time. Even the consumptive recreational user values the activity involved in obtaining "dinner" much more highly than the market values the commercial landing. For example, a commercial fisher receives about $2 per pound for salmon, while economists have determined that anglers spend over $100 per pound for the experience of catching their own salmon. Sharks are being increasingly valued by our society, yet they are usually wasted as unwanted accidental bycatch of the nets of the commercial swordfish and tuna fishers, or they may be wasted in the process of taking the fins for sale.

The cost of complete removal of the five platforms under discussion has been estimated to total several hundred million dollars. Partial removal will result in savings of millions of dollars. Chevron is willing to share savings derived from using the platform jackets as part of a Rigs To Reefs program. This provides an unprecedented opportunity for habitat enhancement. Environmental effects of decommissioning should receive primary attention and we discuss our positions on some of these in other sections. Next, we would like to see maximum funding made available for artificial reefs. This will be enabled by maximizing the shared savings, and will probably result from finding an alternate use for the platforms or by topping them at a safe depth.

The California Rigs To Reefs program may differ from existing programs in other states because the newly constructed reefs may not contain material from rigs. Most of our reefs are likely to be constructed from recycled concrete. High relief may be created from concrete of other appropriate materials. Our program will have many benefits including increased knowledge of coastal marine life, habitat enhancement, cost effective recycling for those providing materials, and redirection of those materials otherwise destined for crowded landfills.

P. Fate and Longevity of Materials

The non-removal option would require protection of the platform from decay and its life span would be maximized. Coastal piers would require maintenance. Their value as habitat, for recreation, or other uses could compensate for the cost of upkeep. Concrete used to augment and enhance the benthic habitat lasts many decades and does not present a problem as it ages. Topped rigs may not be protected. However, the non toxic components of the rigs that have been approved under the National Artificial Reef Plan have life spans estimated to be from decades to hundreds of years. The value of the platform jackets as marine habitat will continue beyond the date that the structures begin to collapse.

Clearly, there are many disposition options that provide positive benefits to society and to marine habitat. These should be fully explored prior to the approval of options that further tax our landfills.