CHAPTER 2

PROPOSED ACTION AND ALTERNATIVES

2.0 SUMMARY

The Cave Gulch-Bullfrog-Waltman Operators have proposed to drill and develop approximately 160 natural gas wells on 107 well sites over the next ten-year planning period (1996-2006) within the Cave Gulch-Bullfrog-Waltman Natural Gas Development Area. The proposed development is in addition to approximately 40 wells that have been drilled and developed or abandoned in the project area. The precise number of additional wells, locations of the wells, and timing of drilling associated with the proposed natural gas development project would be directed by the success of development drilling and production technology, and economic considerations such as the cost of development of leases within the project area with marginal profitability.

This chapter describes the Operators' Proposed Action, two alternatives to the Proposed Action, and the No Action alternative. The alternative selection process is discussed in the following section.

2.1 ALTERNATIVE SELECTION PROCESS

2.1.1 Proposed Action

The Proposed Action of drilling and developing approximately 160 natural gas wells in addition to existing drilling and production operations was determined by summarizing drilling plans projected by the Cave Gulch-Bullfrog-Waltman Operators over the next ten-year planning period. Total life expectancy of the Cave Gulch-Bullfrog-Waltman Natural Gas Production Area is estimated by the Operators to be approximately 30 to 40 years. Drilling estimations were based on reasonably foreseeable spacing and drilling projections into areas within the project area where the planned production and development activities would occur.

43 CFR Subpart 3161, Para. 3161.2 (Responsibility of the Authorized Officer) provides for "maximum ultimate recovery of gas with minimum waste, subject to protection of other natural resources and the environmental quality---". The Proposed Action is a maximum development scenario provided by the Operators that attempts to provide for maximum recovery of the natural gas resource.

For planning purposes, the Operators divided the project area into four areas as shown on Figure 2-1. These areas are basically the same as identified in the Wyoming Reservoir Management Group (WRMG) Preliminary Geologic, Well Spacing, and Reserve Evaluation Report (February 20, 1996). The four areas shown in the RMG preliminary report were used by the Operators to divide the project area because they felt these four areas better defined the Proposed Action than the two area map presented in the RMG final report (Exhibit 11, Cave Gulch-Bullfrog-Waltman EIS Final Geologic, Well Spacing, and Reserve Evaluation Report, June 3, 1996).

The Operators estimate that Areas 1 and 2 would contain a maximum of 42 wells, based on 160-acre well spacing with selective 80-acre drilling. Area 3 would likely support 24 wells, exclusive of

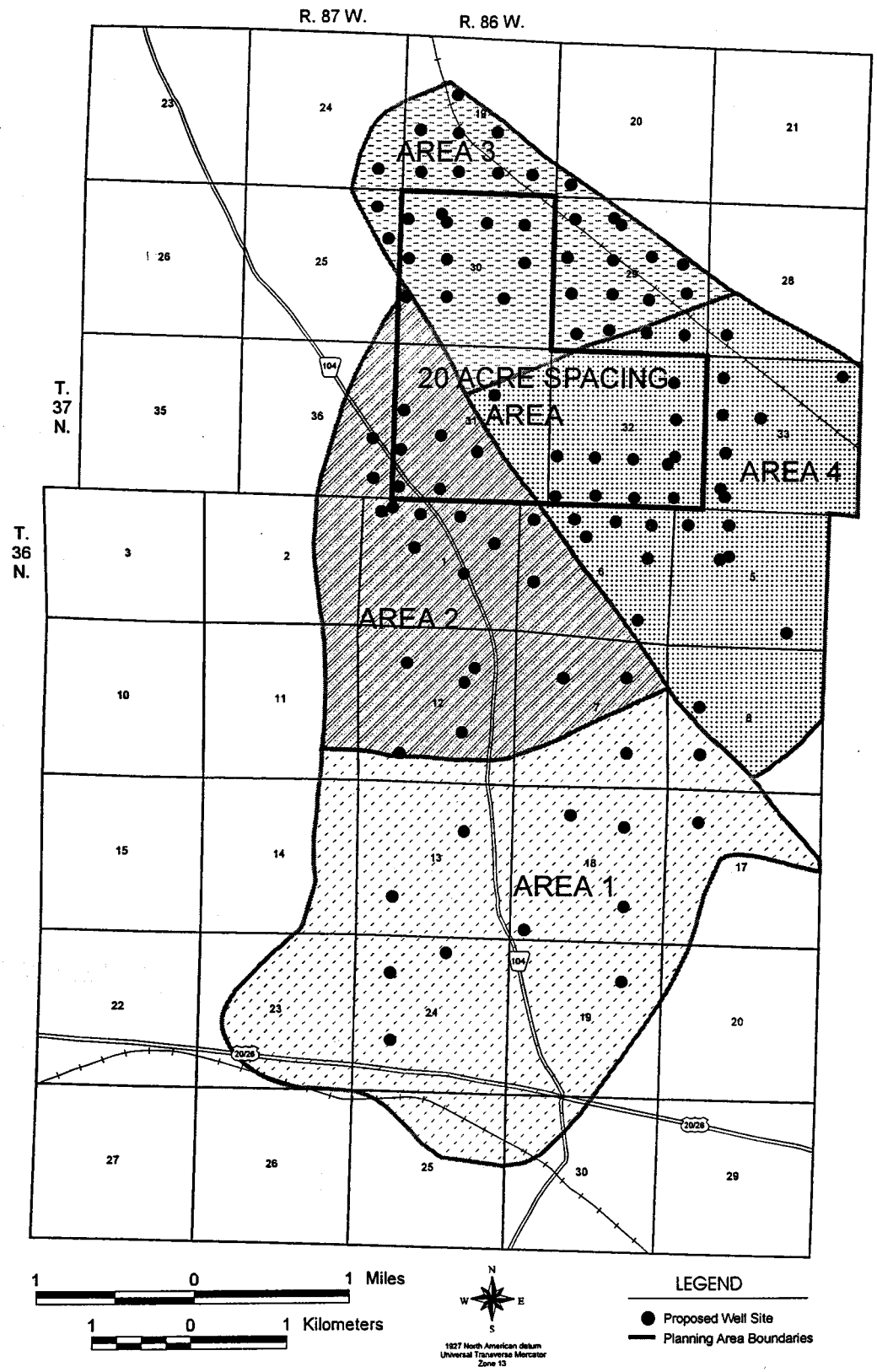


Figure 2-1. Proposed Action Including Operators' Planning Areas. Projected Well Locations are Provided by the BLM and Do Not Necessarily Reflect Those Drilling and Development Plans as Proposed by the Operators Under the Proposed Action.

Sections 30, 31, and 32, probably drilled on 40-acre spacing. Area 4 would potentially support 16 wells, also exclusive of Sections 30, 31, and 32, also on 40-acre well spacing. Full development of Sections 30, 31, and 32 is estimated to require a total of 96 wells developed on 40 and 20-acre spacing. Areas requiring 20 acres for efficient recovery would be developed for the most part by expanding existing well pads and deviating wellbores. Where feasible, the second well would be drilled concurrently with the first well to avoid soil erosion and topsoil conservation concerns. Deeper wells would also utilize expanded common well pads where possible and would likely be on 320 or 640-acre spacing. The Operators estimate 23 additional wells would be drilled to test and develop deep horizons and to twin certain existing wells where needed. Final drilling densities would be determined with additional information collected from reservoir analysis, new wells, additional seismic information, and other methods. The number of wells and well pads proposed by planning area are summarized in the following table and shown on Figure 2-1.

Table 2-1. Number of New Wells Planned by Planning Area.

Planning Area or Section Number	Number of Wells Necessary for Maximum Development	Current Well Status (No. of Wells Drilled)	Estimated Number of Proposed New Wells	Estimated Number of Proposed Well Pads
Area No. 1 and No. 2 (Excluding Sections 30, 31, and 32)	42	15	27	22
Area No. 3 (Excluding Sections 30, 31, and 32)	24	1	23	23
Area No. 4 (Excluding Sections 30, 31, and 32	16	1	15	15
Sections 30, 31, 32[1]	96	24	72	24
Deep Horizon Test (Area or Section Unknown)	24	1	23	23
Total	**202**	**42**	**160**	**107**

[1] In Sections 30, 31, and 32, 24 existing well pads would be used to drill 24 additional new bottom-hole locations.

2.1.2 Alternatives to the Proposed Action

Alternatives to the Proposed Action, as determined from the scoping process and Bureau of Land Management (BLM) management concerns, include: (1) the need for a more defined location of proposed facilities, including well sites, roads, pipelines, and other ancillary facilities; and (2) natural gas development alternatives that better address potential impacts to raptors and their habitats.

Based on the planning information provided by the Operators and alternatives identified through the scoping process, this environmental impact statement (EIS) addresses the Proposed Action and three alternatives. The Proposed Action and alternatives are summarized as follows:

- Proposed Action - Drill and Develop 160 natural gas wells within the Cave Gulch-Bullfrog-Waltman Project Area in addition to existing drilling and production operations.

- Alternative A - Alternative A would consist of a reduced density of surface well pads and production facilities. This alternative would result in a year-round raptor stipulation and increased distance of the seasonal raptor stipulation for ferruginous hawk nests. Casual use and unusual maintenance activities would be managed during key raptor nesting periods

- Alternative B - Alternative B is the BLM Preferred Alternative. Under Alternative B, an area adjacent to the project area would be designated as a Key Raptor Area. Casual use and unusual maintenance activities would be managed during key raptor nesting periods in the Key Raptor Area.

- Alternative C - No action. This alternative implies that Applications for Permits to Drill (APDs) and right-of-way (ROW) actions would be granted by the BLM on a case-by-case basis through individual project and site-specific environmental analysis. Additional gas development could occur on State and private lands within the analysis area under APDs approved by the WOGCC.

The Proposed Action and the three alternatives to the Proposed Action are discussed in detail in the following sections.

2.2 PROPOSED ACTION - DRILL AND DEVELOP 160 NATURAL GAS WELLS WITHIN THE CAVE GULCH-BULLFROG-WALTMAN NATURAL GAS DEVELOPMENT AREA IN ADDITION TO EXISTING DRILLING AND PRODUCTION OPERATIONS.

Specific components of the Cave Gulch-Bullfrog-Waltman Natural Gas Development program are summarized in the following sections. Additional information is provided in Appendix A (Master Surface Use Plan and Natural Gas Pipeline Construction Master Plan). Additional site-specific proposal and resource information would be contained in the individual well APD and/or ROW applications when submitted to the BLM. The BLM will utilize administrative determinations or categorical exclusion reviews to determine if additional site-specific analyses are required, and will prepare environmental assessments tiered to the EIS when necessary.

2.2.1 Preconstruction Planning and Site Layout

The Operators would follow the procedures outlined below to gain approval for the proposed activity on *public lands* within the project area. Development activities proposed on fee and State of Wyoming surface lands would be approved by the WOGCC. The WOGCC permitting procedures require filing an APD with the WOGCC and obtaining a ROW from the surface owner.

- Prior to the start of construction activities, the Operators would submit a Notice of Staking (NOS)/APD/Sundry Notice/ROW Application to the BLM with a map showing the specific location of the proposed activity, (e.g., individual drill sites, pipeline corridors, access roads, or other facilities). The applicant, BLM, and affected surface landowner would conduct an on-site evaluation during which specific construction measures, erosion control needs,

design specifications, resource concerns, etc. would be identified and likely conditions of approval specified. Following the on-site evaluation, the applicant would file the application which would include site-specific construction plans where necessary to describe the proposed development (i.e., drilling plans with casing/cementing program; surface use plan with detailed engineering design, reclamation plans, etc.).

- The proposed facility would be staked by the applicant and inspected by an interdisciplinary team and/or an official from the BLM to ensure consistency with plans in the APD/Sundry Notice/ROW Application.

- More detailed construction plans, when required by the BLM for proposed development in areas of steep slopes, historic trails, riparian areas, etc., would be submitted to the BLM by the applicant. The plans would address concerns that may exist concerning construction standards, required mitigation, etc. Negotiation of these plans between the proponent and BLM, if necessary to resolve differences, would be based on field inspection findings and would take place either during or after the BLM on-site inspection.

- The applicant would revise the APD/Sundry Notice/ROW Application as necessary per negotiations with the BLM. The BLM would then approve the specific proposal and attach the Conditions of Approval to the permit. The applicant then has one year within which to commence the proposed activity.

- Prior to approval, the proposed well site, access road, pipeline corridor, or other sites must be cleared for cultural values, special status plants and animals, paleontological values, nesting raptors, sage grouse, etc. If found, appropriate mitigation would be applied.

Following is a general discussion of construction techniques proposed to be used by the Operators on public lands. These construction techniques would be applicable to drill site, pipeline, and access road proposals within the project area and may vary between the individual Operators.

2.2.2 Construction and Drilling Phase

2.2.2.1 Access Road Construction

The primary road access utilized by the Operators is Wyoming State Highway 20/26 which crosses the southern part of the project area, and Natrona County Road No. 104 as shown in Figure 1-1. Additional access is provided to the interior of the project area by an existing road network developed to service on-going drilling and production activities. The road network within the project area is discussed in detail in Chapter 3, Affected Environment.

BLM Manual Section 9113 road classifications categorize Cave Gulch-Bullfrog-Waltman project area roads into three separate classes:

1) Collector Roads. These roads normally provide primary access to large blocks of land and connect with or are extensions of a public road system such as Wyoming State Highway 20/26. Collector roads are two-lane and require application of the highest road standards. The predominant design speed is 30 to 50 mph depending on terrain and/or as determined

by BLM, and the subgrade width is a minimum of 24 feet (20 feet full-surfaced travelway). Proposed design speeds are shown in Figure 2-2.

2) Local Roads. These are low volume roads providing the internal access network within an oil/gas field. The design speed is 20-50 mph depending on terrain, and the subgrade width is normally 24 feet (20 feet full-surfaced travelway). Low volume roads in mountainous terrain may be single-lane roads with turnouts.

3) Resource Roads. These are normally spur roads that provide point access. Roads servicing individual oil/gas exploration and production locations fall within this classification. The road has a design speed of 15-30 mph and is constructed to a minimum subgrade of 16 feet (12 feet minimum full-surfaced travelway) with intervisible turnouts.

All new access roads within the project area would be constructed for the specific purpose of natural gas field development. Roads would be located to minimize disturbances and maximize transportation efficiency. Where appropriate, and considering such factors as road location, and favorable weather and terrain conditions, the Operators propose to construct natural surface roadways to these well sites to reduce environmental impacts (i.e., soil and vegetation disturbance) and the amount of reclamation. New access roads would be designed and constructed to resource road standards to facilitate reclamation should the well be a dry hole. The operators propose to construct access roads across public lands to productive wells in accordance with BLM Manual 9113 standards. Roads located on private lands would be constructed in accordance with standards imposed by the private land owner. The number of roads would be limited to decrease potential impacts by discouraging development of looped roads and by accessing wells from short resource roads off the local roads. Roads would be closed and reclaimed by the operators when they are no longer required for production operations, unless otherwise directed by the BLM or private landowners. Roads would be designed to minimize disturbance and would be built and maintained as specified by the BLM to provide safe operating conditions at all times. The minimum full surfaced travelway width for resource access roads would be 16 feet. Surface disturbance would be contained within the road ROW and would average 40 feet for resource roads. A typical roadway cross-section with width specifications is shown in Figure 2-3. Approximately 66.0 miles of new roads would be constructed in the project area. Approximately 256.02 acres of new disturbance would result from road construction over the 10-year planning period.

20 and 40-acre spacing. The Operators estimate that each proposed new well on 20 and 40-acre spacing would require an average of 0.4 mile of new road construction (included curves, steep slopes, etc.) and 0.5 mile of pipeline (pipeline to the new well sites would be constructed along the roadway where possible as shown on Figure 2-4). Of this, approximately one-half the pipeline length, or 0.25 mile, would be constructed in the roadway. Road disturbance and cross-country pipeline disturbance would be approximately 40 feet in width. Construction of proposed new roads and pipelines combined is estimated at 120.28 acres. Where 24 new wells would be drilled from existing well pads in the 20- and 40-acre spacing areas, no new roads would be needed, and all new pipelines would be constructed within disturbed areas along existing roads and pipelines. These estimates are shown in Table 2-2.

160-Acre Spacing. The operators estimate that each proposed new well on 160-acre spacing would require an average of 0.75 mile of new road construction and 1.5 miles of pipeline. Of this, approximately 2/3 of the pipeline length, or 1.0 mile, would be constructed in new or existing

Table 2-2. Proposed Action Disturbances (in Acres) Based on Maximum Drilling Spacing .

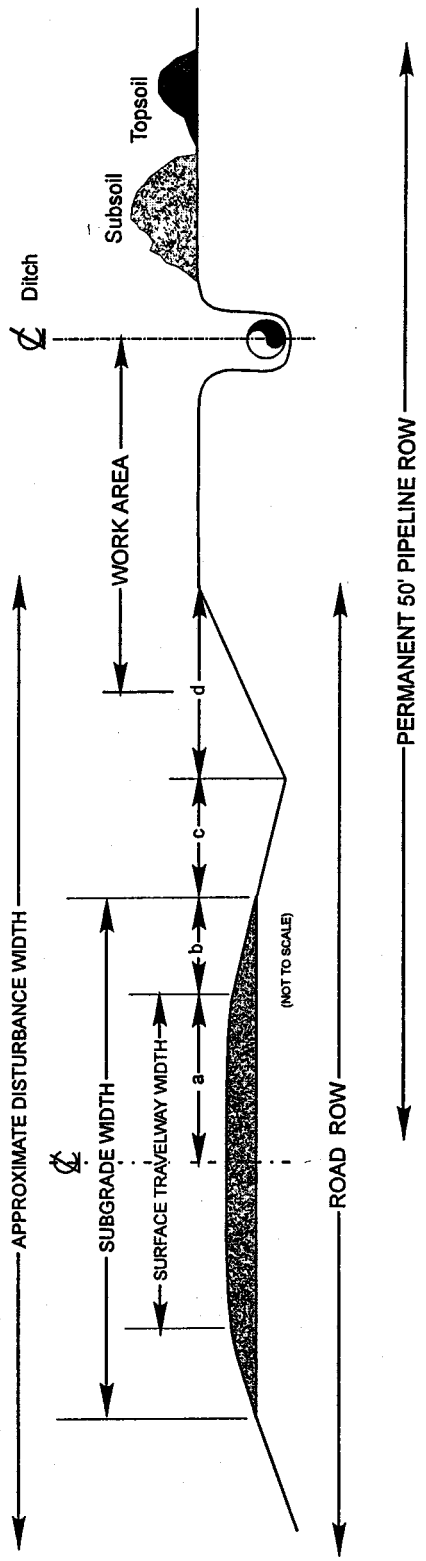
Planning Area or Section Number; Well Spacing	Estimated No. & Type of Proposed Well Pads	Pad Disturbance[1]	Road Disturbance[2]	Cross-Country Pipeline Disturbance[3]	Total Disturbance by Planning Area or Section Number
Area No. 1 and No. 2 (Excluding Sections 30, 31, & 32); 160-Acre Spacing	22 Single	22 x 2.75 = 60.50	22 x 3.64 = 80.08	22 x 2.42 = 53.24	193.82
Area No. 3 (Excluding Sections 30, 31, & 32); 40-Acre Spacing	23 Single	23 x 2.75 = 63.25	23 x 1.94 = 44.62	23 x 1.21 = 27.83	135.70
Area No. 4 (Excluding Sections 30, 31, & 32); 40-Acre Spacing	15 Single	15 x 2.75 = 41.25	15 x 1.94 = 29.10	15 x 1.21 = 18.15	88.50
Sections 30, 31, 32; 20/40-Acre Spacing	24 Twin 24 Expanded Pads	24 x 2.75 = 66.00 24 x 0.8 = 19.2	24 x 1.94 = 46.56 *	24 x 1.21 = 29.04 *	141.60 19.2
Deep Horizon Test (Area/Section Unknown); 320/640-Acre Spacing	23 Single Deep	23 x 2.75 = 63.25	23 x 2.42 = 55.66	23 x 2.42 = 55.66	174.57
Ancillary Facilities	--	--	--	--	35.00
TOTAL	**107**	**313.45**	**256.02**	**183.92**	**788.39**

1 - Average pad disturbance of 2.75 acres is assumed; where existing wells are expanded for twinning, additional average pad disturbance of 0.8 acres is assumed.

2 - Roads = 40 feet wide; lengths vary per well pad according to well spacing: 160-acre spacing = 0.75 mile; 20/40-acre spacing = 0.4 mile; 320/640- acre spacing = 0.5 mile.

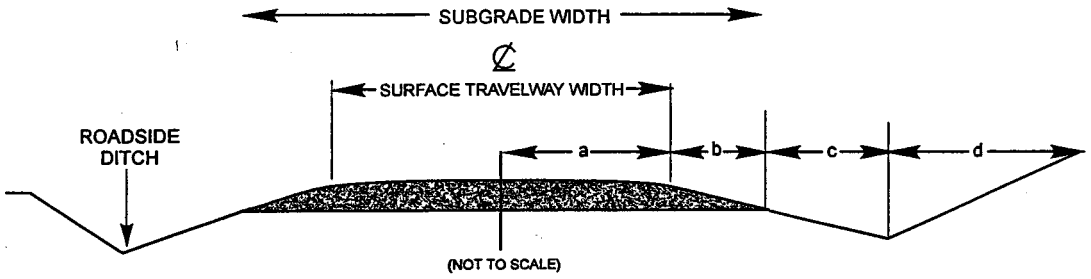
3 - Pipelines = 40 feet wide; lengths vary per well pad according to well spacing: 160-acre spacing = 1.5 miles, of which 1.0 mile would be constructed within access road; 20/40-acre spacing = 0.5 mile, of which 0.25 mile would be constructed within access roads; 320/640- acre spacing = 1.5 miles, of which 1.0 mile would be constructed within existing/new access roads.

* Existing access roads and pipelines would be used for expanded/twinned existing well pads in Sections 30, 31, and 32; thus, no additional disturbance will occur.



	Minimum Subgrade Width (ft.)	Minimum Surfaced Travelway Width (ft)	a (ft)	b (ft)	c (ft)	d (ft)	Approximate Disturbance Width (ft)	Total ROW Width (ft)	Design Speed (mph)
Resource Road	16	12	6	2	4	8	40	50	15-30
Local Road	24	20	10	2	4	8	48	55	20-50
Collector Road	28	24	12	2	4	8	52	60	30-50

Figure 2-2. Typical Roadway Cross-Section with Pipeline Installation Alongside the Road.



	Minimum Subgrade Width (ft.)	Minimum Surfaced Travelway Width (ft)	a (ft)	b (ft)	c (ft)	d (ft)	Approximate Disturbance Width (ft)	Total ROW Width (ft)	Design Speed (mph)
Resource Road	16	12	6	2	4	8	40	50	15-30
Local Road	24	20	10	2	4	8	48	55	20-50
Collector Road	28	24	12	2	4	8	52	60	30-50

DIAGRAM OF TYPICAL TURNOUTS ON RESOURCE ROADS (PLAN VIEW)

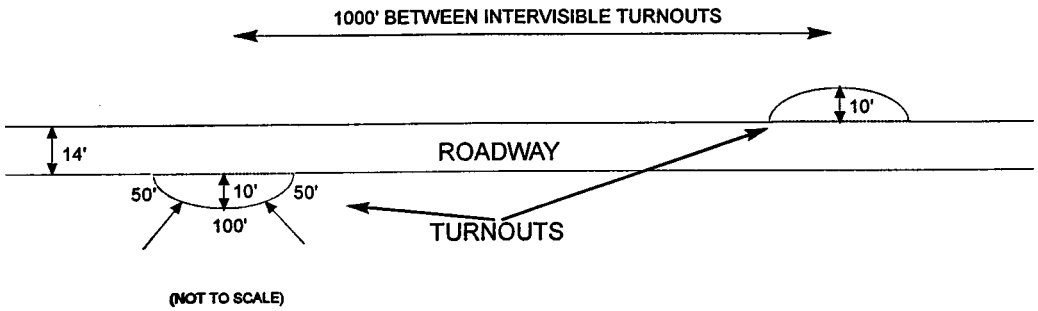
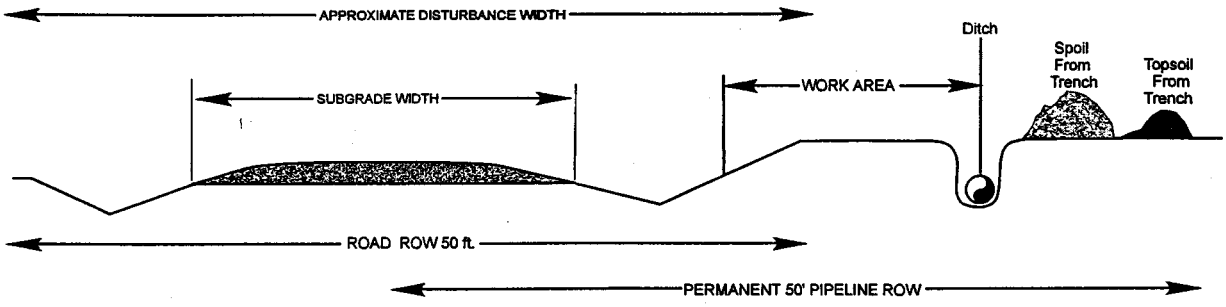
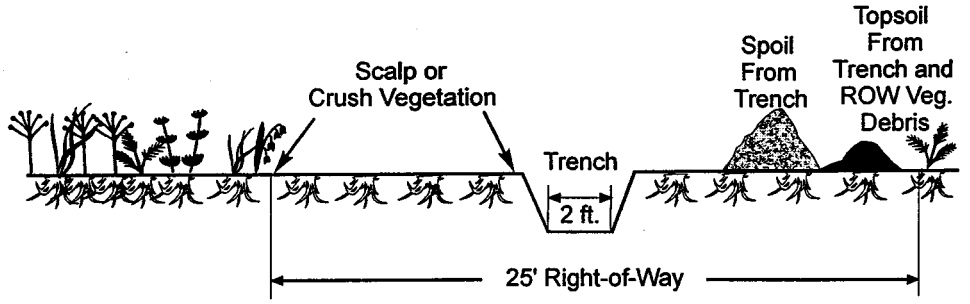


Figure 2-3. Typical Roadway Cross-Section with Width Specifications.

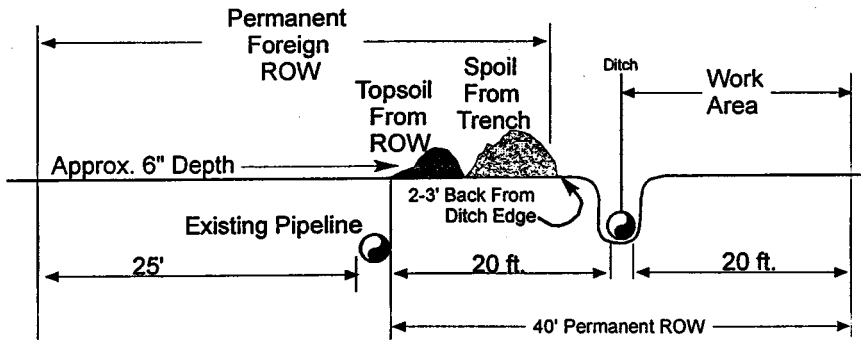
TYPICAL 4" GATHERING PIPELINE ALONG ACCESS ROAD



TYPICAL 4" GATHERING PIPELINE WITH MINIMAL SURFACE DISTURBANCE



TYPICAL 8" - 10" TRANSMISSION PIPELINE PARALLEL TO AN EXISTING PIPELINE



Not To Scale

Figure 2-4. Typical Schematic of Pipeline Installation.

roadways. Road disturbance and cross-country pipeline disturbance would be approximately 40 feet in width. Construction of proposed new roads and pipelines combined is estimated at 80.08 acres. These estimates are shown in Table 2-2.

320/640-Acre Spacing. The operators estimate that each proposed new well on 320/640-acre spacing would utilize existing roads and require an average of 0.5 mile of new road construction and 1.5 miles of pipeline. Of this, approximately 2/3 of the pipeline length, or 1.0 mile, would be constructed in new or existing roadways. Construction of proposed new roads and pipelines, combined is estimated at 55.66 acres. These estimates are shown in Table 2-2.

In the event drilling is non-productive, all disturbed areas, including the well site and new access road, would be reclaimed to the approximate landform that existed prior to construction. Reclamation and site stabilization techniques would be applied as specified in the APD Surface Use Plan or the Right-of-Way Plan of Development (POD). If drilling is productive, all access roads to the well site would remain in place for well servicing activities (i.e., maintenance, improvements, etc.). Partial reclamation would be completed on segments of the well pad and access road ROW no longer needed.

Construction equipment and techniques utilized by the operators would be standard (e.g., crown-and-ditch method.) Should soft spots develop on the roadway during construction or drilling operations, they would be immediately covered with crushed rock or gravel. Where identified during on-site review by the BLM, problem areas on access roads to producing well sites would be graveled to a depth of 4 to 6 inches to reduce erosion and sedimentation. Graveling would be accomplished within 60 days after well completion or as soon as ground conditions permit. Surfacing and base course materials would be obtained from existing, operational gravel pits located on private sources near the project area. Respreading of topsoil and windrowed vegetation to the sideslopes of the newly constructed access roads and revegetation would begin the first appropriate season following the well going on production. Reclamation measures would be implemented the first operating season after well abandonment. The access road to an unproductive well site would be reclaimed upon abandonment of the well using stockpiled topsoil and a seed mixture contained in the approved APD/ROW.

Estimated traffic requirements for drilling operations, completion operations, and production operations are shown in Table 2-3. This information is based on the estimated annual traffic impact of wellfield activities associated with drilling 16 wells. The FREQUENCY column indicates the estimated number of two-way, round trips to the project area for each activity. The TRIPS/YR column is intended to provide a general sense of the annual highway traffic (measured in one-way trips) associated with a given level of drilling activity. The estimated increase in AADT (Annual Average Daily Traffic) provides an estimate of the average daily traffic impact associated with drilling 16 wells. The figures provided in Table 2-3 should be considered general estimates. Activity levels vary over time in response to natural gas prices, weather, corporate decisions and other factors. This table is based on the annual traffic impact of activities associated with drilling 16 wells.

Table 2-3. Estimated Traffic Associated with Proposed Action-Related Well Field Development and Operations Activities.

TYPE OF ACTIVITY	FREQUENCY	TRIPS/YR
Pre-Drilling and Permitting		
Company Representatives	1/well	32
Permitting Consultants	2-10/project	12
BLM Personnel	1/well	32
Archeologist	1/well	32
Surveyors	1/well	32
Access Road/Well Pad Constr. (1 days/well)(assume .25 mi./well)		
Haul truck for dozer	1/well	32
Haul truck for grader	1/well	32
Haul truck for backhoe	1/well	32
Gravel Truck	57/mile	456
Drilling Activities (30 days/well)		
Rig transport vehicles (2 days/well)	20/well	640
Rig crews	2/day	1920
Rig Mechanics	1/week	114
Operating Co. supervisor	2/week	274
Tool pusher	2/week	274
Mud logger	2/week	274
Fuel truck	3/week	411
Mud truck	2/well	64
Mud engineers	2/day	1920
Loggers, engineer's truck	1/well	32
Drill bit deliveries	1/well	32
Water Truck	20/well	640
Miscellaneous	10/well	320
Cementers, pump truck	2/well	64
Cementers, cement truck	2/well	64
Cementers, engineer's pickup	2/well	64
Casing crew truck	2/well	64
Completion (45 days)		
Completion Rig Transport	1/well	32
Casing haulers	2/well	64
Completion equipment truck	3/well	96
Completion crew pickup	1/day	1440
Completion pusher	1/day	1440
Testing (5 days)		
Tubing truck	1/well	32
Service tools	2/week	64
Perforators, logging truck	2/well	64
Perforators engineer's truck	2/well	64
Anchor, installation truck	1/well	32
Anchor testing truck	1/well	32
Fracing*	90/well	2880
Operating Co. supervisor	1/day	160

Table 2-3. Continued.

TYPE OF ACTIVITY	FREQUENCY	TRIPS/YR
Miscellaneous Supplies	4/week	128
Pumping/tank battery	7/well	224
Roustabout crew	1/day	160
Welders	3/well	96
Water truck	45/well	1440
Facility Installation (10 days)		
Welders	2/day	40
Roustabout	1/day	20
Equipment Delivery	7/well pad	112
Insulators (6 days)	2/day	24
Miscellaneous	1/day	20
Pipeline Construction (2 days/well)		
Surveyors	1/well	32
Haul truck for trench digger	1/well	32
Haul truck for pipeline	6/well	192
Roustabout crew	1/well	32
Welder	1/well	32
Reclamation	1/well	32
Operation and Maintenance		
Well Workover (2 wells every 3 years, 21 days)		
Service unit	1/well	2
Service unit equipment truck	1/well	2
Service unit crew pickup	2/day	84
Pusher truck	1/day	42
Operating Co. supervisor pickup	1/day	42
Operations (life of project)		
Gas Processing Plant	6/day	4320
Production foreman	1/4 months	6
Pumper	1/field/day	720
Condensate tank truck	4/day	2880
Reclamation - including downsizing of producing well pads (7 days/well)		
Haul truck for dozer	1/well	32
Haul truck for grader	1/well	32
Haul truck for seeder	1/well	32
Supervisor truck	1/day	224
	TOTAL	**25,299**
(Est. increase in AADT)	**TOTAL/DAY**	**70**

Sources: Chevron USA and Barrett Resources.
*All fracing activities involve about 20 trucks per frac and about 4.5 fracs per well

2.2.2.2 Well Pad Design and Construction

The traditional single-well pad design has been primarily utilized in the project area in the past and would continue to be the predominant drill site design utilized under the Proposed Action, except in Sections 30, 31, and 32.

As discussed in Section 2.1, the Operators would utilize a two-well pad for 20-acre development and occasionally to test and develop deep horizons and to twin certain existing wells where needed. The size of well pads would depend on available drill rigs, terrain limitations at each individual drill site location, and the total depth to which the test well would be drilled. Single, shallow well pads would be constructed from native materials located at the site and would occupy an area of approximately 2.0 acres (350 feet by 250 feet) as shown on Figure 2-5. With inclusion of areas of cut and fill and soil stockpiling, the total disturbed area would be approximately 2.75 acres per well pad. New twin shallow well pads would occupy an area of approximately 400 feet by 220 feet and single deep well pads would occupy an area of approximately 300 feet by 450 feet as shown on Figure 2-6. Where 24 new wells would be drilled from existing well pads, the single well pads may require enlargement of as much as 100 feet by 350 feet. Actual well pad size would be shown on each individual well site APD. Each well pad would be designed so that construction materials would balance as close as possible (i.e., soil materials taken from cuts would be about the same quantity as that needed for fill to construct a level pad), while attempting to minimize the total disturbed area.

As discussed under Section 2.1, anticipated 20-acre development in the north part of the project area would be developed with 2 wellbores per pad, where feasible. Drilling two wells per pad may require expanding the well pad size by approximately 100 feet, adding an extension to the existing reserve pit and locating the drill rig and support equipment approximately 100 feet from the initial wellbore. In some instances, the two wells may be drilled concurrently before completion operations commence. In those cases, the well pad may only be enlarged a nominal amount, up to 25 feet in one direction. Topsoil suitable for reclamation would be stripped to a depth of 6 to 8 inches, more if available, from the well pad area and stockpiled adjacent to the well pad. The location of the topsoil stockpile would be designated on the well pad design plan in the APD. Cut and fill slopes would be designed, if deemed necessary, in a manner that would hold topsoil during reclamation and to facilitate subsequent re-establishment of vegetation. Well pad construction and related facilities would usually require approximately 6 to 8 days to complete, depending on site and terrain limitations. Construction practices would involve use of standard earthmoving equipment such as bulldozers, scrapers, backhoes, and graders.

Components of the well pad include drilling of a rathole and mousehole, construction of a reserve pit to temporarily store drilling fluids, cuttings, and water produced during drilling and testing, and a flare pit. Reserve pits would be constructed so that a minimum of one-half of the total depth is below the original ground surface on the lowest point within the pit. To prevent seepage of fluids, drilling mud gel or poly liners would be utilized to line reserve pits in areas where subsurface material would not contain fluids. Liners would be of sufficient strength and thickness to withstand normal installation and use. The poly liner would be impermeable (i.e., having a permeability of less than 10 to the minus 7 cm/sec) and chemically compatible with all substances which may be put in the pit.

All reserve pits would be fenced with sheep tight wire on 3 sides immediately following construction. The fencing would remain in place as long as drilling operations are ongoing. The fourth side of the reserve pit would be fenced at the time the rig substructure is moved from the drill site location to minimize the potential for loss of wildlife and domestic animals.

Any hydrocarbons floating on the surface of the reserve pit would be removed as soon as possible after drilling operations are complete. Reserve pit fluids would be allowed to dry by evaporation

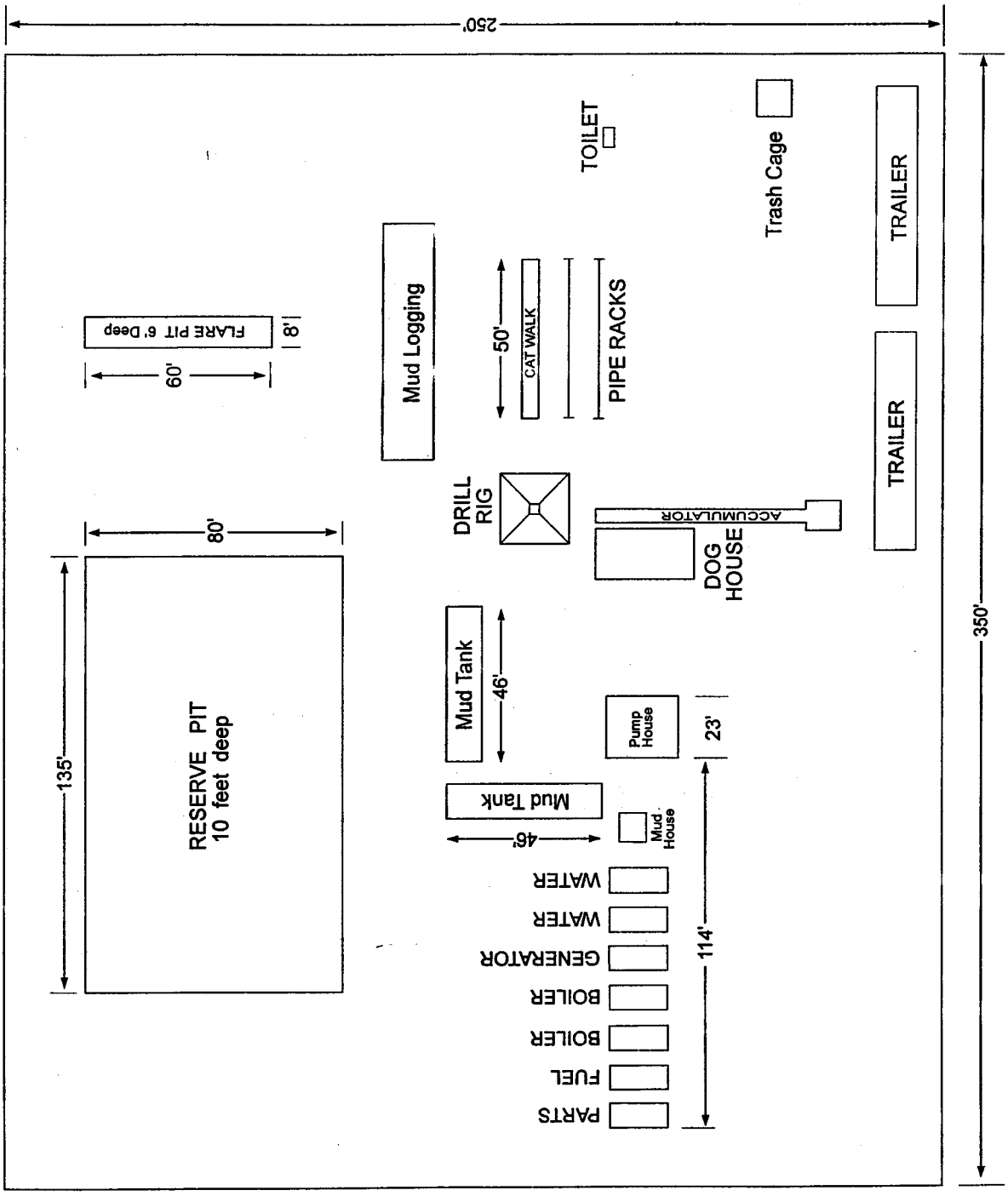


Figure 2-5. Typical Drawing of a Single-well Pad.

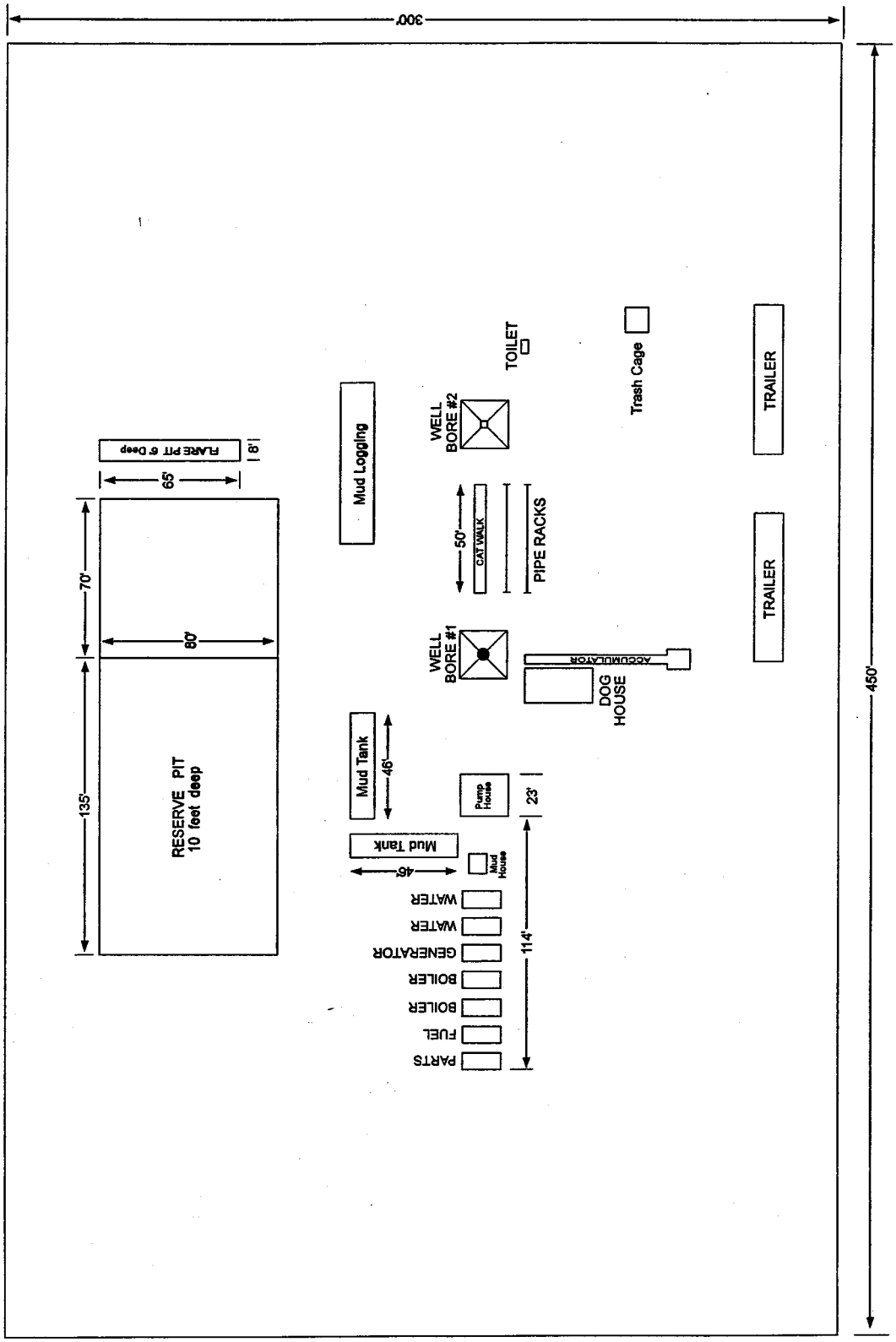


Figure 2-6. Typical Drawing of a Twin-well Pad.

for approximately one year prior to reserve pit closure and drill site reclamation. BLM regulations allow placement of production water in reserve pits for periods up to 90 days. When the pit is backfilled, cuttings and drilling muds will be covered to a depth of at least three feet. If drilling or production fluids remain in the pit after one year, alternate methods of drying, removal of the fluids, or other treatment measures would be determined by the operators in consultation with the BLM. Necessary permits would be acquired by the operators if fluids are transported off-site for disposal. Reserve pits containing hydrocarbons would be netted or flagged.

Service trailers located on the well pad would be self-contained and would not require a septic system. Sewage would be hauled off-site to a State Department of Environmental Quality (DEQ) approved disposal site.

If a well is productive, site erosion and off-site sedimentation would be controlled by promptly revegetating sites in the first appropriate season (fall or spring) after drilling, and providing surface water drainage controls, such as berms, sediment collection traps, diversion ditches and erosion stops as needed. These measures would be described in the individual APD/ROW.

2.2.2.3 Drilling Operations

Each drilling operation would require transport of approximately 25 truckloads of drilling-related equipment and materials to facilitate the drilling operation. This number includes transportation of the drill rig, drill pipe, drilling fluid products, and related support equipment, but does not include the truck traffic required for resupplying the operation (e.g., fuel, drilling fluid additives, etc.). Additional traffic would be variable, depending on the phases of the drilling operation, but should not include more than six or seven vehicles per day per drill site throughout the drilling operation. Total rig-up activities and installation of ancillary facilities would take approximately 3 days to complete.

Most of the drilling would occur in the first 10 years of the project, with the majority of shallow wells drilled in the first five years. Some drilling may occur after the initial 10 year period. All Operators involved in the project would be very active in drilling up acreage during the first 2 to 3 years. After that point, it is expected that drilling activity would slow considerably. The number of wells drilled each year would depend on the number of rigs used. Completion operations for each productive well would commence as soon as possible after the drilling rig moves off location.

The geologic formations to be tested in the project area are the Lance and Fort Union Formations, as well as deeper horizons. The drilling depth is approximately 9,800 feet for a gas well drilled into the Lance Formation, requiring approximately 20 days to drill vertically, barring any major drilling problems. The approximate drilling depth for a Fort Union Formation test is 5,000 feet and would take approximately 7 days to drill vertically. Deeper wells would require from 35 days (Mesaverde Formation) up to 240 days (Muddy Formation) drilling time. Completion operations range from a minimum of 30 days for shallow wells, and more than 60 days for deep wells.

Water, for drilling and service trailer use, would be obtained from State of Wyoming approved locations or local water source wells. Water requirements for drilling average approximately 11,000 barrels (bbls) per well (462,000 gallons). The operators intend to use freshwater-based mud for the majority of their drilling operations.

Methods used for the disposal of produced water (water produced in association with the oil and gas which is separated out at the well location) would vary with each operator but would generally be accomplished by either (1) disposal in an underground injection well, (2) surface discharge, or (3) surface evaporation in lined or unlined ponds. Fort Union and Lance Formation water would meet the criteria for disposal under an NPDES permit. Each operator would obtain the permit(s) necessary for the selected disposal method

Lance and Fort Union Formation water produced by Chevron's wells during production operations is injected into the water-bearing zone of the Lance Formation in the Chevron Waltman No. 15 injection well. Injection perforations are at a depth of 5,831 feet to 6,014 feet in the No. 15 well, which is permitted by the WOGCC. The estimated maximum amount of produced water to be injected in the well is 500 barrels of water per day (BWPD). Depending on timing of availability, quantity, and quality of produced water, some of the produced water could be used in well drilling and completion, and pipeline construction and hydrostatic testing.

Currently, the portions of the Cave Gulch-Bullfrog-Waltman project area that are known to possibly require wells to be located 20 acres apart for efficient drainage are in Sections 30, 31, and 32, Township 37 North, Range 86 West, although other areas may be delineated by future drilling. As previously discussed, where technically and economically feasible, development of 20-acre tracts would be accomplished by drilling 2 wells from pads on 40-acre surface tracts. Appendix C discusses the application of directional drilling in the project area.

2.2.2.4 Pipeline Construction

New gas gathering lines would be constructed to facilitate transportation of natural gas. Gas would be gathered from each producing well by means of a gathering line. Size of the gathering line would be dependent on the production rate at each well. More than one gathering line would be necessary to allow for wet gas and dry gas segregation at the wells. A larger (10-inch) distribution line was built along existing corridors in the fall of 1996.

The gathering lines would generally be constructed in the access road corridors to each well except where limited by topographic features, however, some cross-country construction may occur. Also, not all gathering lines would be buried. Some pipelines may be constructed on the ground surface where terrain limitations such as sensitive soils, steep slopes, and important cultural resources values prohibit burying the pipeline in a trench. When more than one gathering line is required for production, both lines would be laid in a common ditch.

The actual pipeline location would be surveyed and staked prior to start of any construction activities. The company installing the pipeline would submit detailed design plans when required by the BLM for pipeline(s) planned on slopes 25 percent or greater. In order to minimize the total amount of surface disturbance, the pipeline corridor may or may not be cleared of heavy brush prior to any activities. This determination would be made by the BLM prior to construction and would consider factors such as construction crew safety concerns, sideslopes, and brush density. Stripping of topsoil from the pipeline corridor would not be performed. Pipeline construction would occur in a planned sequence of operations common to natural gas pipeline installation specifications and would take place along a corridor of continuous activity. All pipeline installation work would be completed by a contractor working under the supervision of the pipeline company. Construction activities would be confined to the 40-foot ROW.

The pipeline trench would be excavated mechanically with trenching equipment such as a backhoe or trencher. The width of the trench would be approximately 18 - 24 inches. The trench would be constructed to a minimum depth to maintain 36 inches of normal soil cover and 24 inches of cover in consolidated rock.

Pipe laying activities would include pipe stringing, bending, welding, coating, lowering of pipeline sections, and backfilling. The newly-constructed pipelines would be tested to prove structural soundness using either inert gas or hydrostatically tested with water. Integrity tests would be conducted in full compliance with the mandatory BLM ROW stipulations. Gas-testing procedures are summarized as follows. Certified pipeline welders are utilized during pipeline construction to assure high quality work. Ten percent of the pipeline is randomly x-rayed after welding to check the quality of the welds. All fittings on the pipeline are also x-rayed. The pipeline is slowly pressured-up with produced gas to the maximum operating pressure of the pipeline being tied into. This pressure is maintained for 24 hours, then the natural gas is released to sales. If a leak is discovered, the pipeline is purged to the atmosphere, the pipeline repaired, and the pressure tested again by the same procedures.

Necessary water appropriation permits would be obtained from the Wyoming State Engineer's Office. Water would be taken from local water sources near the analysis areas. After testing operations are completed, the water would be pumped into water hauling trucks and transported to drilling locations within the project area to be used in conjunction with the drilling operations. If not needed for drilling operations, the test water would be disposed of onto undisturbed land having vegetative cover or into an established drainage channel in a manner as not to cause accelerated erosion.

Water produced in association with natural gas or oil production could also be used to hydrostatically test new pipeline. Produced water used for testing would subsequently be disposed of in a manner approved by the BLM in the Plan of Development (POD) or ROW application.

Subsoil would be backfilled and compacted into the trench over the pipe. Site regrading would occur where necessary. Reclamation of the pipeline route would occur as authorized by the BLM ROW Grant.

There are several natural gas pipeline transmission systems currently in operation within the project area. The Operators plan to use the existing network of gas-gathering pipelines for transport of natural gas. New gathering pipelines would become part of the gas-gathering system currently managed by KN Energy, Inc. (Pony Express Pipeline) and Colorado Interstate Gas Company (CIG) (Figure 1-2).

New gas gathering pipelines would range in size from 2 to 6 inches in diameter. Distance from a new well to the existing gathering system would range from 0.5 to 2.5 miles. An overall field average number for pipeline length is not used since half of the activity would be concentrated in three square miles in the northern part of the project area. The maximum width of the disturbance area would be 40 feet, including both lines installed in the access roads and those which cross country. Approximately 183.9 acres of new disturbance would result from cross country pipeline construction over the ten-year planning period. Acreage disturbance estimates are shown in Table 2-2.

Pipelines would be placed adjacent to existing pipelines or roads where possible. A typical schematic of pipeline installation procedures is shown in Figure 2-2.

2.2.2.5 Estimated Employment Requirements

The estimated number of persons employed in various phases of the pre-drilling, construction, drilling, completion/testing and producing well services including pipeline construction are shown in Table 2-4. It should be noted that many of the personnel employed on different phases of the project are not employed full-time on an annual basis but are employed for shorter periods of time during which their skill or craft is needed. In most cases, the length of time for each activity is indicated in addition to the expected time on-site for the different activities involved in field development.

Table 2-4. Estimated Employment Requirements, Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Area.

Employment Category	Number of Personnel	Expected Period of On-Site Occurrence
Pre-Approval and Permitting (Time varies)		
Company Personnel	2	Commute one time/well
BLM Personnel	2	Commute one time/well
Permitting contractor	1	Irregular commute
Surveyors	2	Commute one time/well
Archeologist	1	Commute one time/well
Access Road and Well Pad Construction 5 days/well)	3	Commute daily
Rig Transport and Rig-Up Operations (3 days/well)	20	Commute daily
Drilling (20 days/shallow well)		
Drilling foreman	1	Reside on-site
Tool pusher	1	Reside on-site
Mud logger	2	Reside on-site
Morning tour rig crew	5	Commute daily
Evening tour rig crew	5	Commute daily
Casing crew	5	Commute two times
Cementing Crew	6	Commute two times
Mud engineer	1	Commute daily
Drilling engineer	1	Commute daily
Salesman, Service Companies	--	Irregular commute
TOTAL	**52.00**	
Completion and Testing (25 days/shallow well)		
Completion foreman	1	Commute daily during completion
Tool pusher	1	Commute daily
Rig crew	4	Commute daily
Stimulation crew	6-20	Irregular commute
Wireline crew	3	Commute one time

Table 2-4. Continued.

Employment Category	Number of Personnel	Expected Period of On-Site Occurrence
Completion and Testing (25 days shallow/well)		
Flow test crew	1	Commute 10 times
Roustabout	2	Commute daily
Salesman, Service Companies	--	Irregular commute
TOTAL	**18-32**	
Pipeline Construction		
Surveyors	2	Commute one time
Truck Drivers	2	Commute 3 times
Construction Crew	5	Commute one time
Reclamation Crew	2	Commute one time
TOTAL	**11**	
Well Operations		
Well Workover (irregular, not scheduled)		
Workover foreman	1	Commute daily
Rig pusher	1	Commute daily
Rig crew	3	Commute daily
Wireline crew	3	Irregular commute
Service crew	3	Irregular commute
Roustabout	3	Irregular commute
TOTAL	**14**	
Operations (life of project)		
Gas Processing Plant operators	6	Commute Daily
Production foreman	1	Irregular commute
Pumper	1	Commute seven days/week
Condensate hauler	1	Commute five days/week
TOTAL	**9**	
Reclamation - including down-sizing of producing well pads (seven days/well)		
Reclamation crew	3	Irregular commute

2.2.2.6 Natural Gas Production

2.2.2.6.1 Completion and Testing Operations

All access roads to productive well sites would be maintained for well servicing activities (i.e., maintenance, improvements, etc.) if drilling is productive. Reclamation would be completed on segments of the well pad and access road ROW no longer needed.

Well completion operations involve the placement and cementing of well casing and perforation, stimulation and testing of potentially productive zones. Well casing involves running steel casing pipe into the open borehole and cementing the pipe in place. Perforation, stimulation, and testing

requires large equipment to be transported and utilized at the well site, and flaring of produced gas. A typical cased well bore would consist of conductor pipe, surface casing, and production casing.

Surface casing would be set at the start of drilling operations to prevent gas, oil, condensate, or water from migrating from formation to formation and to isolate producing zones. Setting and cementing of production casing provides separation and isolation from abnormally pressured zones, usable water zones, and other mineral deposits. The well casing would be perforated in the productive interval to allow the flow of hydrocarbons to the surface. Approximately 10,000 barrels of water may be needed in the completing and testing operations per well. Most completions use a string of tubing that is inserted in the casing to the top of the perforated productive zone to isolate the flow of gas, condensate, and water to flow to the surface where it is collected, measured, and contained. Completion operations typically last 3 to 4 weeks for each shallow well, and 60 days for deep tests. Figure 2-7 shows a typical well pad layout during production/testing operations.

2.2.2.6.2 Production Operations

Production operations would occur on a year-round basis, occasionally limited by weather, maintenance, workover operations, and ground and site conditions. Production operations would require use and maintenance of access roads within the project area on a year-round basis. It may become necessary in the future to install powerlines to wellsites along existing roads. Two instances where powerlines may be constructed would include the need to install cathodic protection and to run emission control units. However, precise locations of powerline facilities is unknown at this time since the operators have not completed enough wells to determine actual power needs.

Typical gravel road maintenance would occur during the summer and early fall months. Winter maintenance would include blading of snow from the access road as necessary, with the blade kept above the ground surface.

Each individual natural gas production site for a single-well would be approximately 1.5 acres (300 feet by 220 feet) as shown in Figure 2-8. A typical production facility layout for a twin well is shown in Figure 2-9. Production sites for deep horizon tests would occupy approximately 3.1 acres (300 feet by 450 feet). A typical completed (cased) well bore diagram for a vertical well within the project area is shown in Figure 2-10 for a Waltman Unit well, and Figure 2-11 for a Cave Gulch Unit well.

Cut and fill slopes associated with each production well site would be reclaimed as prescribed in the APD/ROW. Each producing well would be serviced by its own production facility, unless consolidation of production facilities for closely spaced wells is technically and economically feasible. All wells would be manually operated, requiring daily site visits by a service vehicle. Casing prevents drill hole cave-in and aquifer mixing, confines production to the well bore, and provides a means of controlling pressure to facilitate installation of surface and subsurface well equipment.

A typical cased well bore consists of conductor pipe, surface casing, and production casing. Surface casing is set deep enough and cemented to the surface to protect freshwater aquifers. Surface casing is set at the start of drilling operations. Setting production casing and cementing it in place is designed to prevent gas, oil, condensate, or water from migrating from formation to

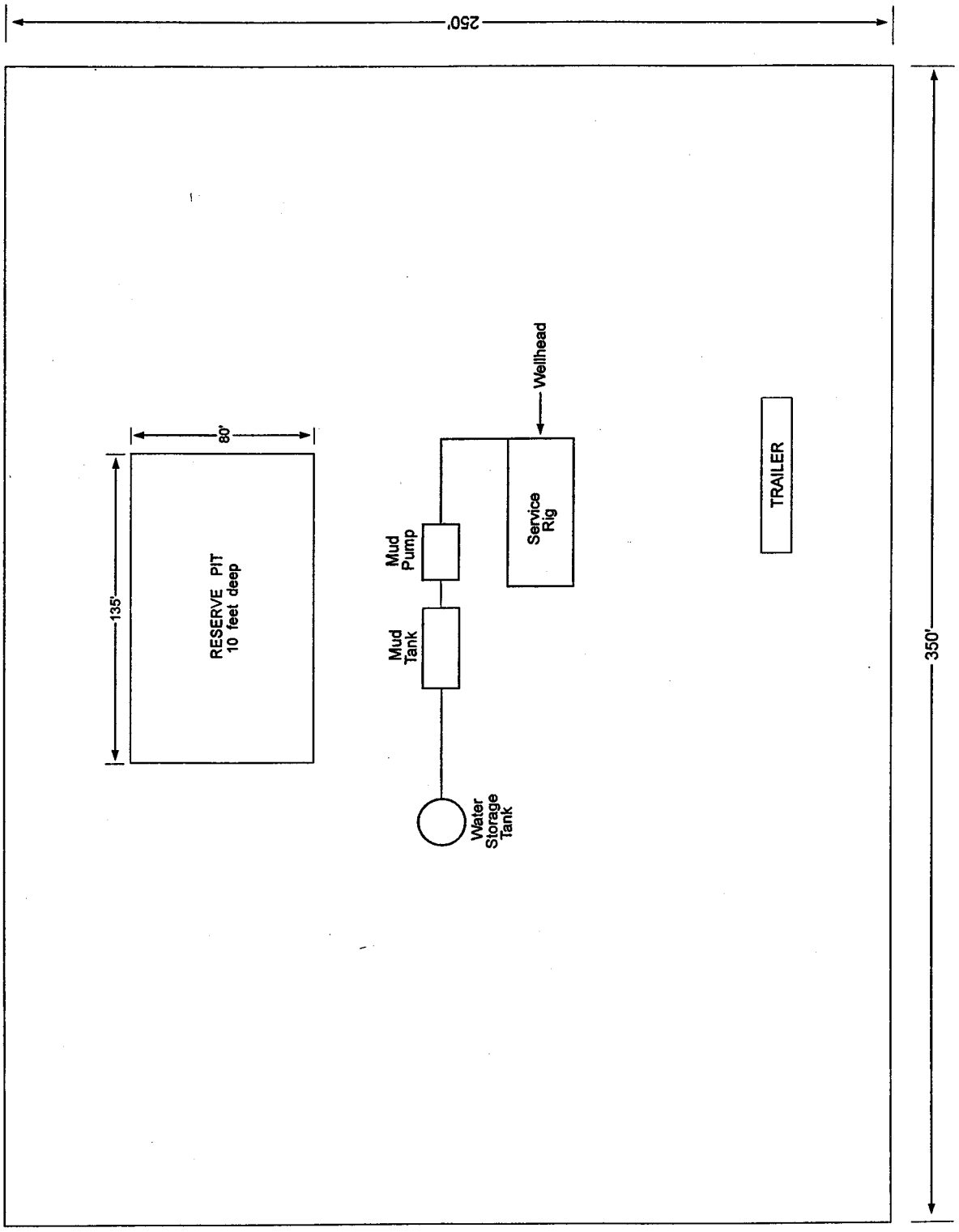


Figure 2-7. Typical Well Pad Layout During Production Testing/Completion.

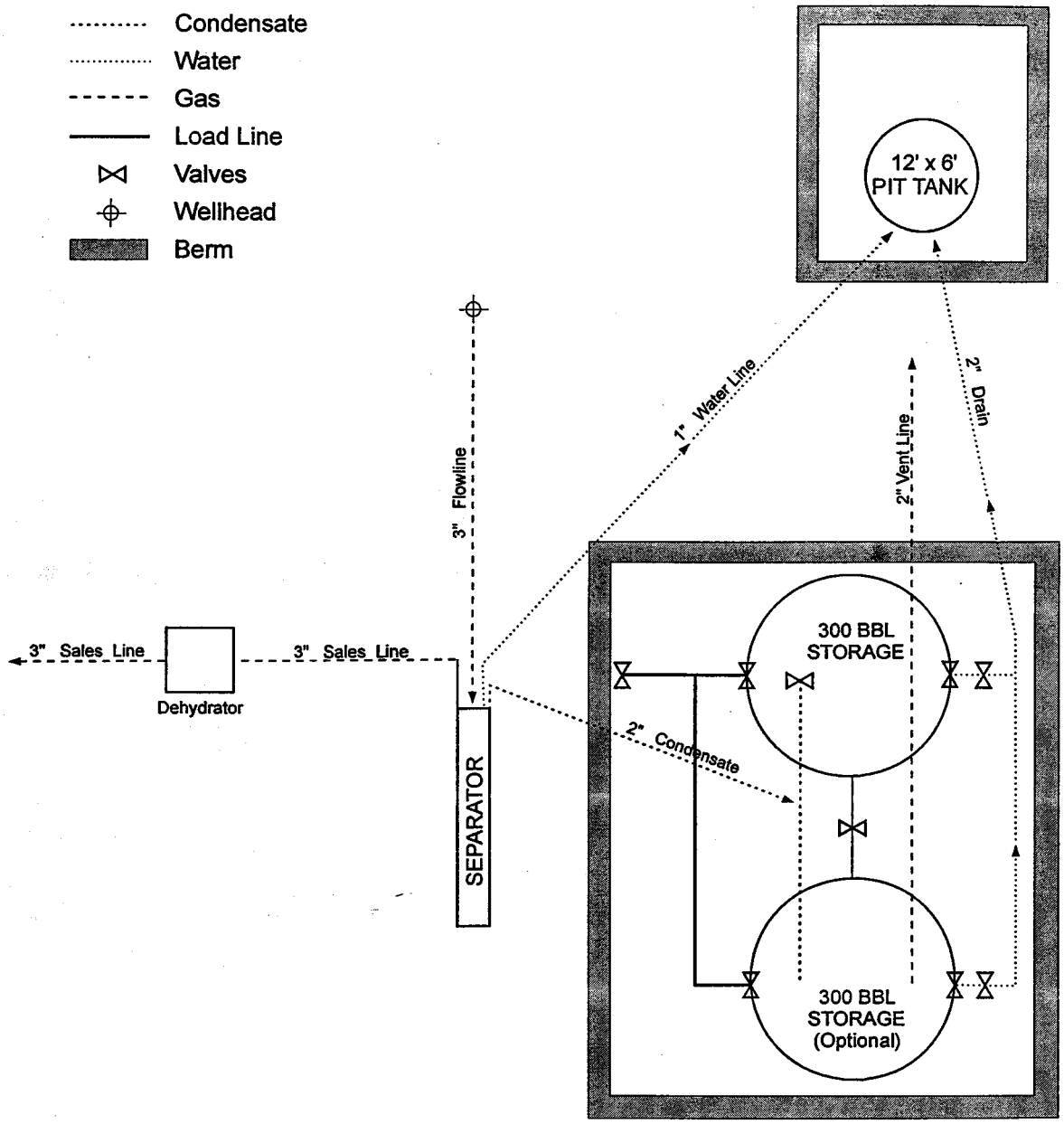


Figure 2-8. Production Well Facilities Installed at the Production Well Sites.

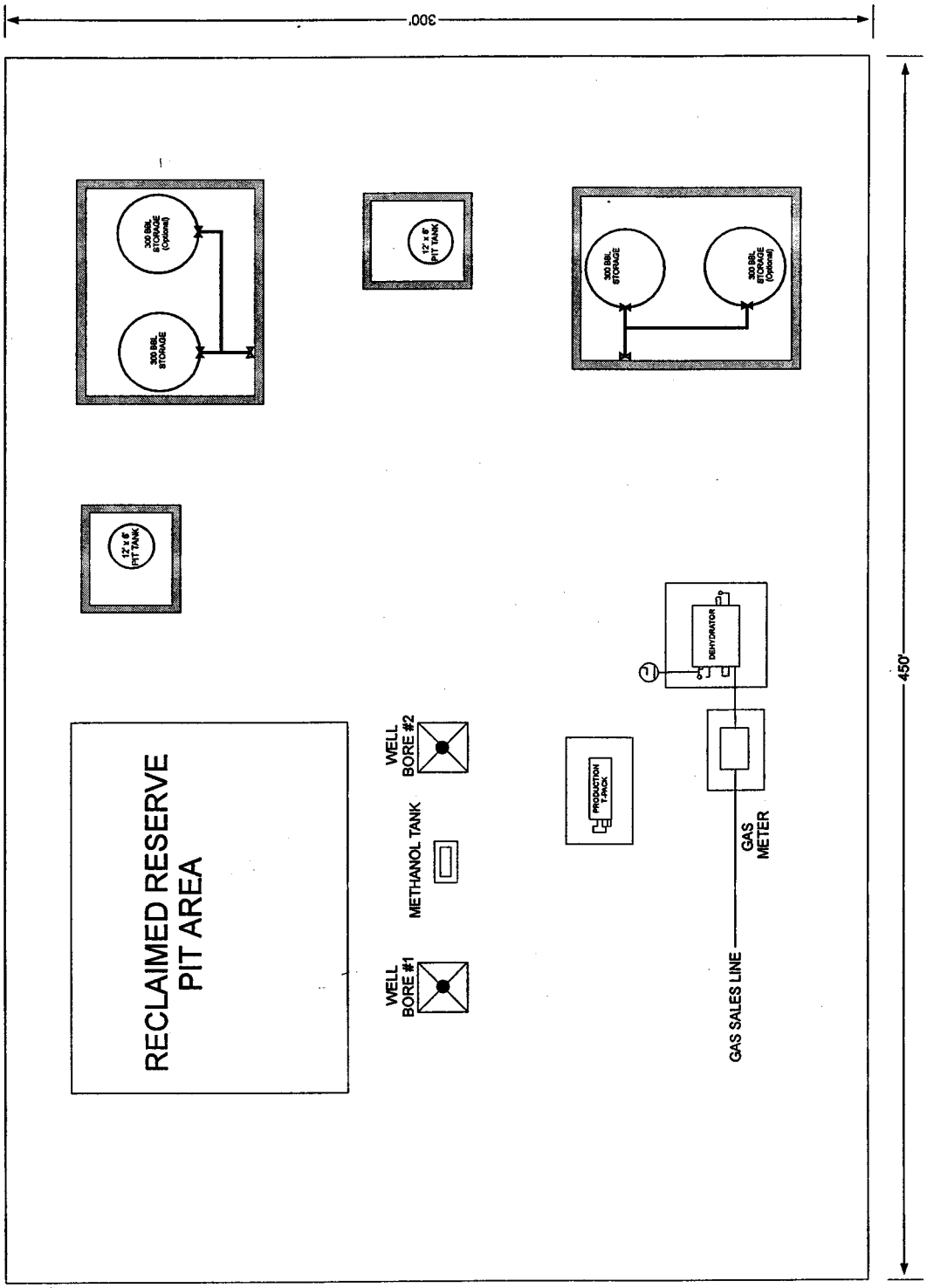
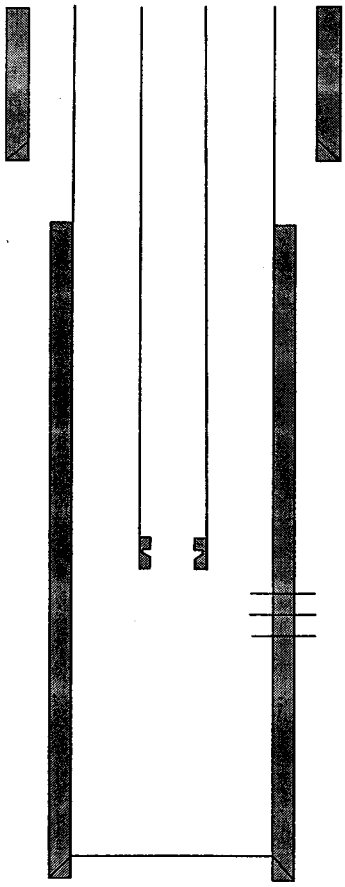


Figure 2-9. Typical Production Facilities Layout for a Twin Well.

Typical Waltman Unit Completion - Vertical well bore



Note: Conductor pipe may or may not be set, depending on drilling techniques.

8⅝" Surface casing cemented to surface

Top of cement to be as high as possible above production interval; optimum cement volume to be determined based on experience.

2⅜" tubing w/ profile nipple on bottom

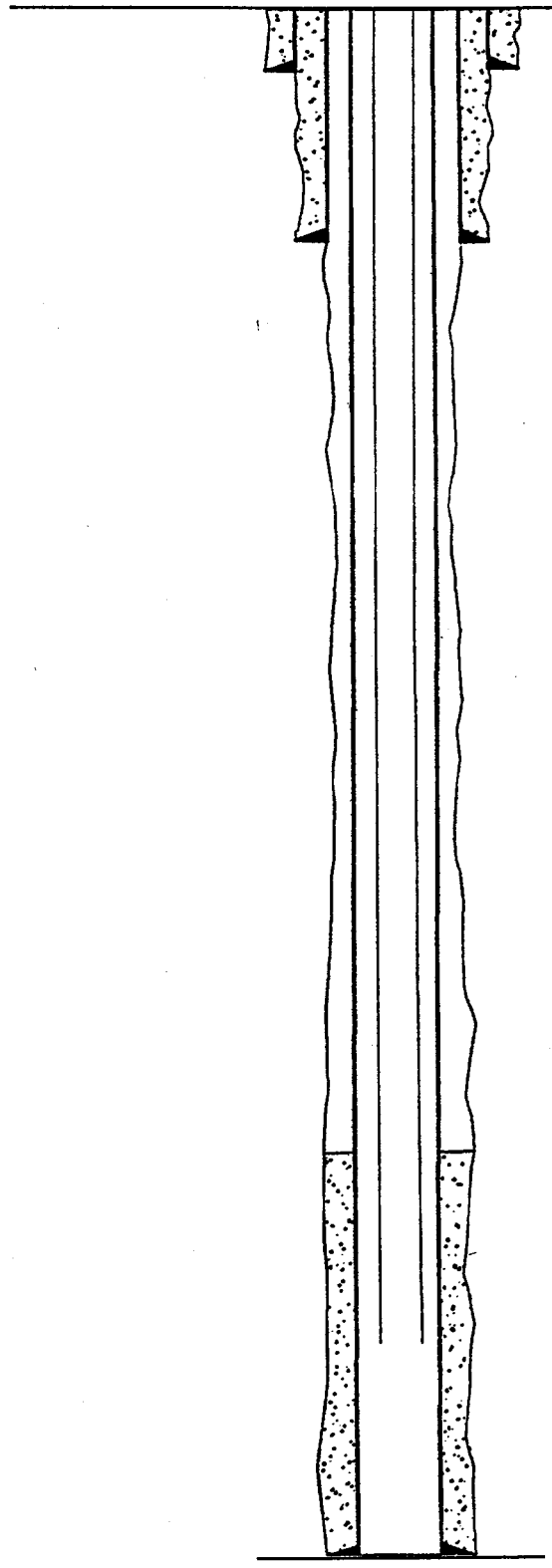
Packer may be used depending on well conditions and completion techniques.

Lance or Ft. Union perforations

Float collar 2 jts off bottom

5½" casing run to TD w/ Float Shoe on bottom

Figure 2-10. Typical Completed Wellbore Diagram for a Vertical Well – Waltman Unit.



STRUCTURAL

* 16" CONDUCTOR @ 30'
* GROUT TO SURFACE

12¼" Hole

* 8⅝" CASING
* SET @ ±400'
* CEMENT-SURFACE

VERTICAL DEVIATION < 2'

7⅞" Hole

* NOTE:

Formation, casing, and cement depths will vary depending on well location

* Production Tubing 2⅜"

* Top of Cement-5000' fillup (40% Excess)

* Set 5½" Casing at TD

Figure 2-11. Typical Completed Wellbore Diagram for a Vertical Well -- Cave Gulch Unit.

formation and to isolate producing zones. Most completions in the project area use a string of tubing that is inserted in the casing to the top of the perforated productive zone to allow gas, condensate, and water to flow to the surface where it is collected, measured, and contained.

2.2.2.7 Production Estimates

The following are expected natural gas production performances for project area. Estimates are provided in the Final Geologic, Well Spacing, and Reserve Evaluation Report prepared by the Wyoming Reservoir Management Group (June 3, 1996).

Original gas in-place:	1,556.8 billion cubic feet (BCF)
Cumulative Production:	78.9 BCF
Remaining recoverable reserves:	1,010.9 BCF

2.2.2.8 Ancillary Facilities

The operators and pipeline companies would construct ancillary facilities as necessary to meet production needs. Such facilities would include, but not be limited to: (1) produced water disposal equipment, (2) individual well site compression, (3) individual well site liquids (hydrocarbon liquids) recovery units, (4) electrical power lines, (5) gas metering stations, (6) pipeline pigging facilities, (7) field storage buildings, and (8) cathodic protection facilities. The number and exact location of such ancillary facilities is not known at this time, but most would be installed within the boundaries of existing disturbances. For those facilities which would not be in existing disturbed areas, the operators estimate that approximately 25 acres of new disturbance would occur.

A liquids recovery plant is tentatively proposed in Section 1, Township 36 North, Range 87 West, on BLM administered surface and adjacent to the paved county road. A right-of-way from the BLM would be needed for the plant site. Powerlines to service the site are in-place. The surface area required for the plant site is estimated to be 10 acres. Pipeline access to the plant site would cross the county road from the Arminto Meter Station. The 10-inch gathering line installed by Barrett during 1996 would serve the inlet to the plant site. No new outlet lines are planned.

Components of the plant include an inlet separator, molecular sieve dehydrator, cryogenic process skid, residue gas compressors, process heater, generators, and natural gas liquid storage tanks. A Section 21 permit from the Wyoming Department of Environmental Quality (WDEQ) would be required for plant construction and operation. The plant would operate continuously and be manned during daylight hours.

2.2.2.9 Geophysical Operations

No additional geophysical operations are currently planned by the operators in the Cave Gulch-Bullfrog-Waltman project area, but are possible in the future.

2.2.2.10 Site Restoration and Abandonment

The Operators propose to completely reclaim all disturbed areas not needed for production activities including: (1) pipeline ROW; (2) portion of road ROW not needed in the function of the road; and (3) the portion of the drill pad not needed during production. Reclamation would generally

include: (1) complete cleanup of the disturbed areas (drill sites, access roads, etc.); (2) restoration of the disturbed areas to the approximate ground contour that existed prior to construction; (3) ripping of disturbed areas to a depth of 12 to 18 inches; (4) replacement of topsoil over all disturbed areas; (5) seeding of reclaimed areas with the seed mixture prescribed in the Surface Use Plan (Appendix A) or Plan of Development for the Proposed Action; and (6) fertilizing, if considered necessary by the BLM AO.

Specific reclamation recommendations for use with the natural gas drilling and production operations within the project area are described in Appendix B. The final set of reclamation measures to be applied would be developed in the APD or ROW grant by each operator in consultation with the BLM and would be specific to each site and the conditions at that site.

As indicated previously, many disturbances would be reclaimed. Disturbances associated with drill sites would thereby be reduced by reclaiming cut, fill, and soil stockpiling areas. The size of the remaining well pad would vary; shallow single well pads would be 1.5 acres after reclamation; twin well pads would be 2.0 acres in size; and deep well pads would be 3.1 acres. This would represent an approximate reduction of 82.45 acres (26 percent reduction) for all new well sites. All cross-country pipelines would be reclaimed representing an approximate reduction of 183.92 acres of disturbed area. Approximately 128.01 acres of access road disturbance would be reclaimed, for a total of 394.4 acres reclaimed. Ancillary facilities would not be reclaimed during operations since they would be totally occupied for operational activities. Thus, during the production phase, the disturbance area would be reduced from 788.39 acres to 394.01 acres, an approximate 50 percent reduction.

2.2.2.11 Preconstruction Planning and Design Measures

- The operators and the BLM will make on-site interdisciplinary (ID) team inspections of each proposed and staked facility site (e.g., well sites), new access road, access road reconstruction, and pipeline alignment projects so that site-specific recommendations and mitigation measures can be developed.

- New road construction and maintenance of existing roads in the Cave Gulch-Bullfrog-Waltman project area will be accomplished in accordance with BLM Manual 9113 standards unless private landowners or the State of Wyoming specify otherwise.

- The operators will prepare and submit an APD for each drill site on federal leases to the BLM for approval prior to initiation of construction. Also prior to construction, the operators or their contractors will submit a Sundry Notice and/or ROW application for each pipeline and access road segment on federal leases. The APD will include a Surface Use Plan that will show the layout of the drill pad over the existing topography, dimensions of the pad, volumes and cross sections of cut and fill, location and dimensions of reserve pit, and access road egress and ingress. The APD, Sundry Notice, and/or ROW application plan will also itemize project administration, time frame, and responsible parties. In addition, a reclamation plan would be developed by the operators for each facility in consultation with the BLM.

- The operators will slope-stake construction activities when required by the BLM (e.g., steep and/or unstable slopes) and receive approval from the BLM prior to start of construction.

2.2.2.12 Project-Wide Mitigation Measures

The Operators propose to implement the following mitigation measures and procedures on public lands to avoid or mitigate resource or other land use impacts. These measures would be applied on privately owned surface and State of Wyoming lands unless otherwise specified by the involved private and/or State surface owners. An exception to a mitigation measure and/or design feature may be approved on public land on a case-by-case basis when deemed appropriate by the BLM. An exception would be approved only after a thorough, site-specific analysis determined that the resource or land use for which the measure was put in place is not present or would not be significantly impacted.

Resource-Specific Mitigation

The operators propose to implement the following resource-specific mitigation requirements:

Range Resources and Other Land Uses

- The operators will coordinate with the affected livestock operators to ensure that livestock control structures remain functional during drilling and production operations.

Air Quality

- The operators will not burn garbage or refuse at the drill sites or other facilities.
- When an air quality, soils loss, or safety problem is identified as a result of fugitive dust, immediate abatement will be initiated. The BLM will approve the procedure (e.g., application of water and magnesium chloride) for dust abatement at facility construction sites as well as locations for use and application rates. Water, if approved for this purpose, must be obtained by the operator from State-approved source(s).

Minerals/Paleontology

Paleontological resource values would be protected through the following mitigation measures:

- If recommended by the BLM, each proposed facility located in areas with known and potential vertebrate paleontological resource significance (Class II) will be surveyed by a BLM-approved paleontologist prior to surface disturbance. Also, if paleontological resources are discovered at any time during construction, all construction activities will halt and BLM personnel will be immediately notified. Work will not proceed until paleontological materials are properly evaluated by a qualified paleontologist.

Soils

- Reduce the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of personnel. The operators will restrict off-road vehicle activity.

- Where feasible, buried pipelines will be located immediately adjacent to roads to avoid creating separate areas of disturbance and in order to reduce the total area of disturbance.

- The operators will avoid using frozen or saturated soils as construction material.

- The operators will minimize construction activities in areas of steep slopes, and apply special slope stabilizing structures if construction cannot be avoided in these areas.

- Design cutslopes in a manner that will allow retention of topsoil, surface treatment such as mulch, and subsequent revegetation.

- Selectively strip and salvage topsoil or the best suitable medium for plant growth from all disturbed areas to a depth of 6 to 8 inches, more if available, on all well pads.

- Where possible, minimize disturbance to vegetated cuts and fills on existing roads that are improved.

- Install runoff and erosion control measures such as water bars, berms, and interceptor ditches if needed, as prescribed in Appendix B.

- Install culverts for ephemeral and intermittent drainage crossings. Design all drainage crossing structures to carry the 25- to 50-year discharge event, or as otherwise directed by the BLM.

- Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Maintain a 100-foot wide buffer strip of natural vegetation where possible (not including wetland vegetation) between all construction activities and ephemeral and intermittent drainage channels.

- Include adequate drainage control devices and measures in the road design (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipators) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. Implement a revegetation program as soon as possible to re-establish the soil protection afforded by a vegetal cover.

- Upon completion of construction activities, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites; replace up to 12 inches of topsoil or suitable plant growth material over all disturbed surfaces; apply fertilizer as required; seed (specified in a reclamation plan); and mulch.

Water Resources

- Limit construction of drainage crossings to no-flow periods or low-flow periods.

- Minimize the area of disturbance within perennial, ephemeral and intermittent drainage channel environments.

- Prohibit construction of well sites, access roads, and pipelines within 500 feet of surface water and/or riparian areas. Exceptions to this would be granted by the BLM based on an environmental analysis and site-specific mitigation plans.

- Design channel crossings to minimize changes in channel geometry and subsequent changes in flow hydraulics.

- Maintain vegetation barriers occurring between construction activities and ephemeral and intermittent channels.

- Design and construct interception ditches, sediment traps/silt fences, water bars, silt fences and revegetation and soil stabilization measures if needed.

- Construct channel crossings for buried pipelines such that the pipe is buried a minimum of four feet below the channel bottom.

- Regrade disturbed channel beds to the original geometric configuration with the same or very similar bed material.

- Case wells during drilling, and case and cement all wells in accordance with Onshore Order No. 2 to protect accessible high quality water aquifers. High quality water aquifers are aquifers with known water quality of 10,000 ppm TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Further, wells will adhere to the appropriate BLM cementing policy.

- Reserve pits will be constructed so that a minimum of one-half of the total depth is below the original ground surface on the lowest point within the pit. To prevent seepage of fluids, drilling mud gel or poly liners will be utilized to line reserve pits in areas where subsurface material would not contain fluids. Liners will be of sufficient strength and thickness to withstand normal installation and use. The poly liner will be impermeable (i.e., having a permeability of less than 10 to the minus 7 cm/sec) and chemically compatible with all substances which may be put in the pit.

- Maintain two feet of freeboard on all reserve pits to ensure the reserve pits are not in danger of overflowing. Shut down drilling operations until the problem is corrected if leakage is found outside the pit.

- Extract hydrostatic test water used in conjunction with pipeline testing and all water used during construction activities from sources with sufficient quantities and through appropriation permits approved by the State of Wyoming.

- Discharge hydrostatic test water in a controlled manner onto an energy dissipator. The water is to be discharged onto undisturbed land that has vegetative cover, if possible, or into an established drainage channel. Prior to discharge, treat or filter the water to reduce pollutant levels or to settle out suspended particles if necessary. If discharged into an

established drainage channel, the rate of discharge will not exceed the capacity of the channel to safely convey the increased flow. Coordinate all discharge of test water with the Wyoming State Engineers Office (SEO) and the BLM.

- Discharge all concentrated water flows within access road ROWs onto or through an energy dissipator structure (e.g., riprapped aprons and discharge points) and discharge into undisturbed vegetation.

- Develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as required per Wyoming Department of Environmental Quality (WDEQ) storm water National Pollution Discharge Elimination System (NPDES) permit requirements. The WDEQ requires Operators to obtain a field permit for fields of 20 wells or more.

- Exercise stringent precautions against pipeline breaks and other potential accidental discharges of toxic chemicals into adjacent streams. If liquid petroleum products storage capacity exceeds criteria contained in 40 CFR Part 112, a Spill Prevention Control and Countermeasures (SPCC) plan will be developed and complied with in accordance with 40 CFR Part 112, dated December 1973.

- Coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (COE).

Fisheries

- No fisheries mitigation is anticipated.

Vegetation and Wetlands

- Seed and stabilize disturbed areas with mixtures and treatment guidelines prescribed in the approved APD/ROW.

- Evaluate all project facility sites for occurrence and distribution of waters of the U.S., special aquatic sites, and jurisdictional wetlands. All project facilities would be located out of these sensitive areas. If complete avoidance is not possible, minimize impacts through modification and minor relocations. Coordinate activities that involve dredge or fill into wetlands with the COE.

- Complete a site-specific survey for plant species of concern and their habitat for the Cave Gulch-Bullfrog-Waltman analysis area prior to initiation of any ground-surface disturbance. If species of concern or their habitat are found, impacts would be minimized by avoiding these areas where possible. Minor adjustments to the location of project facilities would be made to avoid plant species of concern and/or their habitat. Copies of these surveys would be provided to the Resource Area Wildlife Biologist.

Wildlife

- During reclamation, establish a variety of forage species that are useful to resident herbivores by specifying the seed mixes in the approved APD/ROW.

- Prohibit unnecessary off-site activities of operational personnel in the vicinity of the drill sites. Inform all project employees of applicable wildlife laws and penalties associated with unlawful take and harassment.

- To facilitate big game movements and minimize the potential for injuries, do not fence access road ROWs.

- When an `active' raptor nest is within 0.25 to 0.50 mile (depending on species and line of sight) of a proposed well site, restrict construction during the critical nesting season for that species.

Visual Resources

- Utilize existing topography to screen roads, pipeline corridors, drill rigs, well heads, and production facilities from view.

- Paint well and central facilities site structures with flat colors that blend with the adjacent surrounding undisturbed terrain, except for structures that require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements. The color selected for this project is Carlsbad Canyon.

Noise

- Muffle and maintain all motorized equipment according to manufacturers' specifications.

Recreation

- Minimize conflicts between project vehicles and equipment and recreation traffic by posting appropriate warning signs, implementing operator safety training, and requiring project vehicles to adhere to low speed limits.

Socioeconomics

- Implement hiring policies that will encourage the use of local or regional workers who will not have to relocate to the area.

- Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This will include scheduling of project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.

Cultural Resources

- If a site is considered eligible for, or is already on the National Register of Historic Places (NRHP), avoidance is the preferred method for mitigating adverse effects to that property.

- Mitigation of adverse effects to cultural/historical properties that cannot be avoided would be accomplished by the preparation of a cultural resources mitigation plan.

- If cultural resources are discovered at any time during construction, all construction activities will halt and BLM personnel would be immediately notified. Work will not resume until a Notice to Proceed is issued by the BLM.

Health and Safety

- Sanitation facilities installed on the drill sites and any resident camp site locations would be approved by the WDEQ.

- To minimize undue exposure to hazardous situations, require measures that would preclude the public from entering hazardous areas and place warning signs alerting the public of truck traffic.

- Haul all garbage and rubbish from the drill site to a State-approved sanitary landfill for disposal. Collect and store any garbage or refuse materials on location prior to transport in closed containers.

- During construction and upon commencement of production operations, the operators will have a chemical or hazardous substance inventory for all such items that may be at the site. The operators will institute a Hazard Communication Program for its employees and will require subcontractor programs in accordance with OSHA 29 CFR 1910.1200. These programs are designed to educate and protect the employees and subcontractors with respect to any chemicals or hazardous substances that may be present in the work place. It will be required that as every chemical or hazardous material is brought on location, a Material Safety Data Sheet (MSDS) will accompany that material and will become part of the file kept at the field office as required by 29 CFR 1910.1200. All employees will receive the proper training in storage, handling, and disposal of hazardous substances.

- Spill Prevention Control and Countermeasure (SPCC) Plans will be written and implemented as necessary in accordance with 40 CFR Part 112 to prevent discharge into navigable waters of the United States.

- Chemical and hazardous materials will be inventoried and reported in accordance with the Superfund Amendments and Reauthorization Act (SARA) Title III. 40 CFR Part 335, if quantities exceeding 10,000 pounds or the threshold planning quantity (TPQ) are to be produced or stored in association with the Proposed Action. The appropriate Section 311 and 312 forms will be submitted at the required times to the State and County Emergency Management Coordinators and the local fire departments.

- Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), will be transported and/or disposed of in accordance with all applicable federal, state, and local regulations.

- The operators plan to design operations to severely limit or eliminate the need for Extremely Hazardous substances. The operators also plan to avoid the creation of hazardous wastes as defined by RCRA wherever possible.

- Appendix D (Hazardous Substances Management Plan) provides a summary of the hazardous chemicals that may be on a drilling or production site with examples of representative chemicals and associated physical and health hazards. At this time it is impossible to determine if these items would be stored in sufficient quantities to require reporting under SARA Title II, and in some cases, the items may not be on site at all. However, all items would become part of the Hazard Communications Plan where required, and employee training would be completed as required.

2.3 ALTERNATIVE A

Alternative A - Summary

Reduced density of surface well pads and production facilities. A year-round raptor stipulation and increased distance of the seasonal raptor stipulation for ferruginous hawk nests. Manage casual use and unusual maintenance activities during key raptor nesting periods.

Under Alternative A, fewer surface well locations and individual production facilities would be constructed than are identified under the Proposed Action. The surface well pad density to be analyzed under this alternative is shown on Figure 2-12. Up to 99 surface well pads would be developed under this alternative. Within each unit, or within individual leases that are not unitized, centralized facilities would be constructed for compression, condensate, or water separation, and product treatment and storage. Facilities or individual well pads, such as line heaters or compression necessary to move the product to the central facility would be allowed. Support facilities (e.g., electricity) needed to operate line heaters or compressors on the well pads would also be allowed. Under Alternative A, where bottom-hole well density identified under the Proposed Action is 20-acre or 40-acre spacing, there would be an average of one central facility per 160 acres. Under Alternative A, where the bottomhole well density identified under the Proposed Action is over 40 acre spacing, there would be an average of one central facility per 640 acres. Up to 28 central production facilities would be developed under this alternative. One liquid hydrocarbon recovery/treatment plant, and up to two centralized compression stations would be constructed under this alternative.

Within the project area, the raptor stipulation specifying a seasonal 1/4 to 1/2 mile buffer zone would become a year-round 1/4 to 1/2 mile buffer zone (mapped specifically) for selected nests. Also within the project area, the seasonal 1/4 to 1/2 mile buffer zone would be expanded to a seasonal 1-mile buffer zone for ferruginous hawk nests (Figure 2-12). This EIS evaluates these seasonal and buffer restrictions within the EIS cumulative impact analysis area (Chapter 5). The remainder of the nests in the project area would be subject to the existing RMP seasonal stipulation. Under Alternative A, the following condition would apply to all nests in the project area. The condition would be addressed in all future field development analyses.

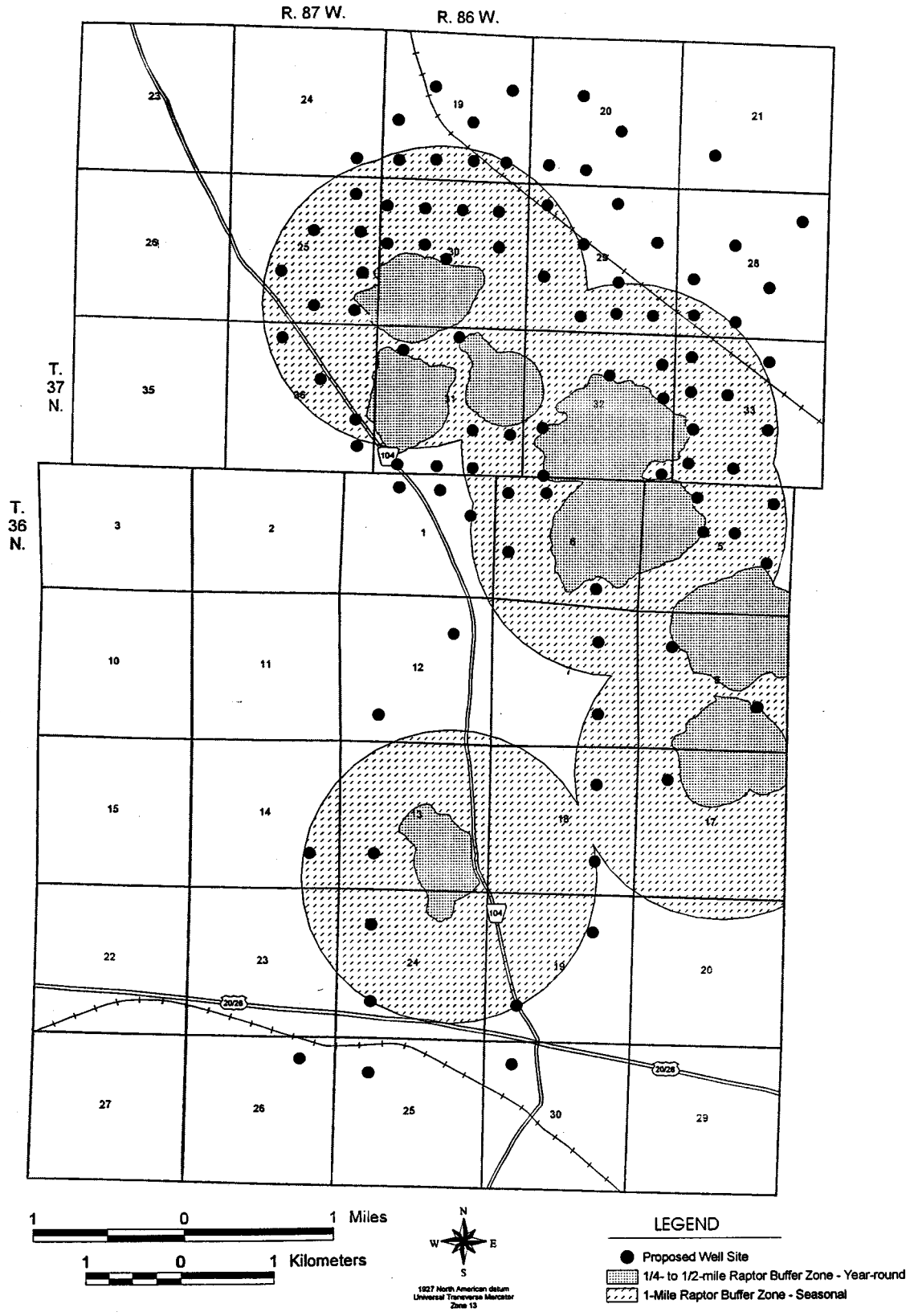


Figure 2-12. Alternative A Including Proposed Well Locations and Raptor Buffer Zones.

Activities ordinarily considered "casual use" (e.g., location/route surveying and staking; cultural resource inventories), and extensive maintenance activities such as work-over operations, would be managed in raptor nesting areas during the February 1 through July 31 nesting season provided raptors are occupying the area. Before raptors have selected a nest, casual uses and extensive maintenance would not be allowed within the occupied nesting territories of active pairs in the area for the year. Upon nest selection, casual uses and extensive maintenance would not be allowed within the identified 1-mile buffer zone for occupied ferruginous hawk nests, and the 1/4- to 1/2-mile buffer zone of the occupied nests for other raptor species. The buffer zones will be defined by BLM for the specific occupied raptor nests after nest selection has occurred. In cases where facilities are located within the zone of influence of an occupied raptor nest, no extensive or significant maintenance activities shall be allowed during the critical egg laying, incubation, and initial brooding periods of nesting. Exact dates of maintenance exclusion will be determined by the BLM Authorized Officer (AO). Response to emergency circumstances would not be restricted.

When oil and gas field development is proposed anywhere in the PRRA, the year-round buffer, increased seasonal buffer, casual use, and unusual maintenance stipulations would have to be evaluated in an environmental assessment and selected in the decision document before being implemented. The objective is to provide continuous protection to selected raptor nests and nesting habitat rather than protecting the nesting raptors only during the nesting season.

For the project area, the following is proposed under Alternative A:

The golden eagle nests would have a 1/4- to 1/2-mile year-round buffer zone. The ferruginous hawk nests would have a 1/4- to 1/2-mile year-round buffer zone and an additional seasonal buffer for a total buffer of 1-mile from the nest during February 1 through July 31. Eleven nests have been identified for analysis through the EIS process, and the specific nest areas have been mapped for these year-round buffers (Figure 2-12). These nests were identified based on biological factors and nest habitat conditions for analysis in this alternative.

Nest No. 2 - golden eagle
Nest No. 3 - ferruginous hawk
Nest No. 4 - ferruginous hawk
Nest No. 5 - golden eagle
Nest No. 12 - ferruginous hawk
Nest No. 15 - ferruginous hawk
Nest No. 20 - golden eagle
Nest No. 25 - ferruginous hawk
Nest No. 26 - ferruginous hawk
Nest No. 33 - ferruginous hawk
Nest No. 72 - ferruginous hawk

The technical requirements for Alternative A, including the project-wide mitigation measures, are the same as described for the Proposed Action. The construction of this alternative would involve 268.35 acres of drill site disturbance, 223.88 acres of combined new road and pipeline disturbance, 142.78 acres of cross-country pipeline disturbance, and 35 acres of ancillary facility disturbance,

Table 2-5. Alternative A Disturbances (in Acres).

Planning Area or Section Number; Well Spacing	Estimated No. & Type of Proposed Well Pads	Pad Disturbance[1]	Road Disturbance[2]	Cross-Country Pipeline Disturbance[3]	Total Disturbance by Planning Area or Section Number
160-Acre Spacing	21 Single	21 x 2.75 = 57.75	21 x 3.64 = 76.44	21 x 2.42 = 50.82	185.01
80-Acre Spacing	30 Single	30 x 2.75 = 82.50	30 x 1.94 = 58.20	30 x 1.21 = 36.30	177.00
40-Acre Spacing	27 Single	27 x 2.75 = 74.25	27 x 1.94 = 52.38	27 x 1.21 = 32.67	159.30
20-Acre Spacing	19 Twin 2 Expanded Pads	19 x 2.75 = 52.25 2 x 0.8 = 1.6	19 x 1.94 = 36.86 *	19 x 1.21 = 22.99 *	112.10 1.60
Ancillary Facilities	--	--	--	--	35.00
TOTAL	**99**	**268.35**	**223.88**	**142.78**	**670.01**

1 - Average pad disturbance of 2.75 acres is assumed; where existing wells are expanded for twinning, additional average pad disturbance of 0.8 acres is assumed.

2 - Roads = 40 feet wide; lengths vary per well pad according to well spacing: 160-acre spacing = 0.75 mile; 20/40-acre spacing = 0.4 mile; 320/640- acre spacing = 0.5 mile.

3 - Pipelines = 40 feet wide; lengths vary per well pad according to well spacing: 160-acre spacing = 1.5 miles, of which 1.0 mile would be constructed within access road ROW; 20/40-acre spacing = 0.5 mile, of which 0.25 mile would be constructed within access road ROW; 320/640- acre spacing = 1.5 miles, of which 1.0 mile would be constructed within existing/new access roads.

* Existing access roads and pipelines would be used for expanded/twinned existing well pads in Sections 30, 31, and 32; thus, no additional disturbance will occur.

for a total of approximately 670.01 acres (Table 2-5). A large portion of this area would be reclaimed as described under the Proposed Action, thus reducing the total disturbance by 362.97 acres to 307.04 acres (54 percent reduction).

2.4 ALTERNATIVE B (BLM PREFERRED ALTERNATIVE)

Alternative B - Summary

An area adjacent to the project area would be designated as a Key Raptor Area. Manage casual use and unusual maintenance activities during key raptor nesting periods in the Key Raptor Area.

Under Alternative B, more surface well locations and individual production facilities would be constructed than are identified under the Proposed Action and Alternative A. The surface well pad density to be analyzed under this alternative is shown on Figure 2-13. Up to 114 surface well pads would be developed under this alternative.

Within the project area, development proposed within 1/4- to ½-mile of an occupied raptor nest would be subject to existing RMP seasonal raptor restrictions. Under Alternative B, the following condition would apply to all nests in the project area. The condition would be addressed in all future field development analyses.

> Activities ordinarily considered "casual use" (e.g., location/route surveying and staking; cultural resource inventories), and extensive maintenance activities such as work-over operations, would be managed in raptor nesting areas during the February 1 through July 31 nesting season provided raptors are occupying the area. Before raptors have selected a nest, casual uses and extensive maintenance would not be allowed within the occupied nesting territories of active pairs in the area for the year. Upon nest selection, casual uses and extensive maintenance would not be allowed within the identified 1/4- to ½-mile buffer zones of the occupied nests. The buffer zones will be defined by BLM for the specific occupied raptor nests after nest selection has occurred. In cases where facilities are located within the zones of influence of an occupied raptor nest, no extensive or significant maintenance activities shall be allowed during the critical egg laying, incubation, and initial brooding periods of nesting. Exact dates of maintenance exclusion will be determined by the BLM Authorized Officer (AO). Response to emergency circumstances would not be restricted.

The main provision of this alternative is to set aside the federal mineral estate and federal surface estate adjacent to the project area for special management of raptor habitat. The area would be designated the Powder River Draw Key Raptor Area. Table 2-6 lists the legal description of the area; Figure 2-13 shows the boundary of the area.

The management priority within the Powder River Draw Key Raptor Area would be for raptor nesting. The objective is to reduce the frequency and intensity of human activities and reduce the extent of surface disturbance so that raptors may nest successfully over the long term. Management of other resources, however, would not be precluded.

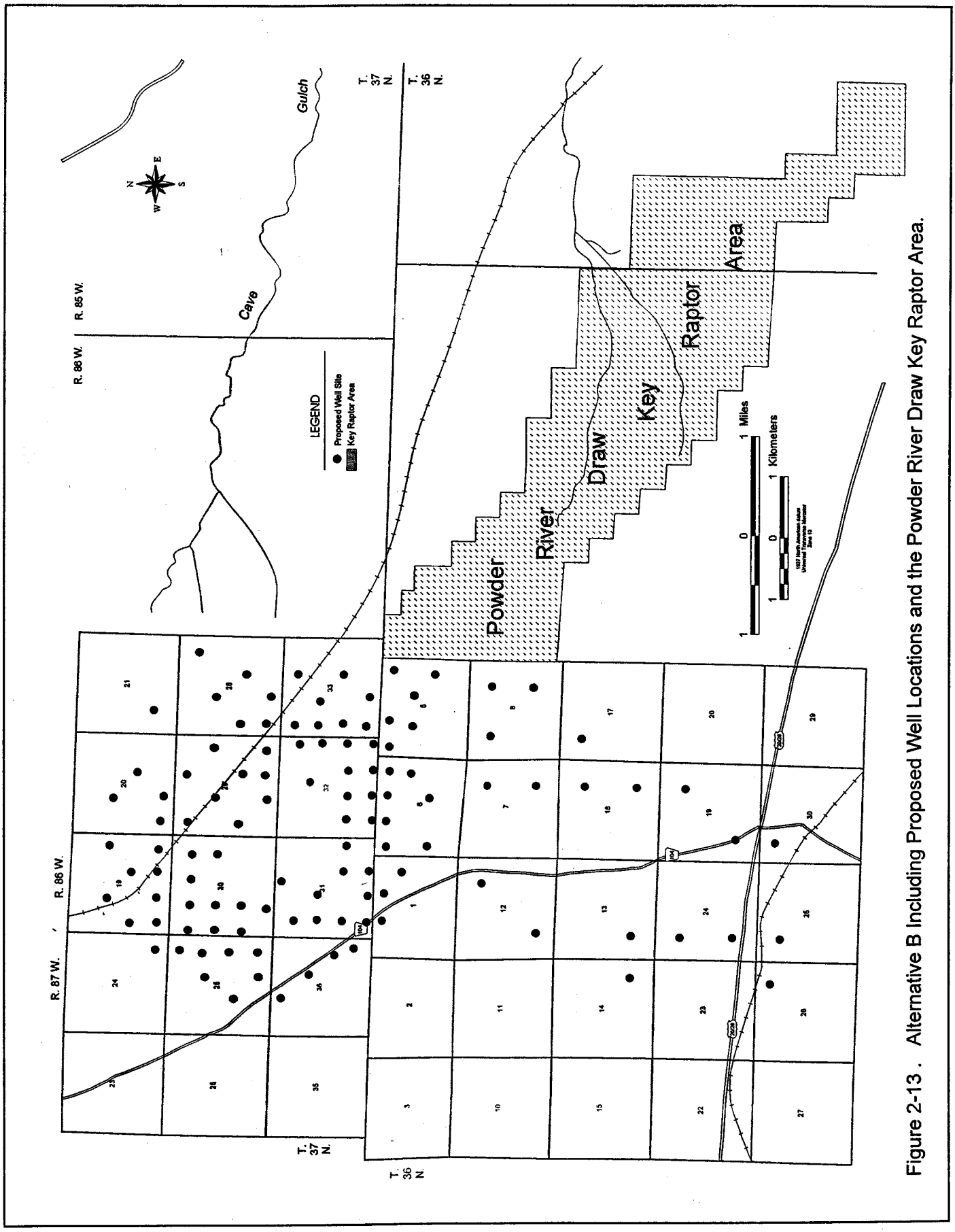


Figure 2-13 . Alternative B Including Proposed Well Locations and the Powder River Draw Key Raptor Area.

Table 2-6. Proposed Powder River Draw Key Raptor Area Legal Land Descriptions.

Township 36 North, Range 85 West, 6th Principal Meridian

Section 18, Lots 3-4, E1/2SW1/4,SE1/4	312.98 acres
Section 19 (All)	625.40
Section 29, W1/2NW1/4, S1/2	400.00
Section 30, NE1/4, NE1/4SE1/4	200.00
Section 32, N1/2N1/2	160.00

Township 36 North, Range 86 West, 6th Principal Meridian

Section 3, SW1/4SW1/4	40.00 acres
Section 4, Lots 6-19	502.55
Section 9 (All)	611.48
Section 10, SW1/4NE1/4* W1/2, SE1/4	520.00
Section 11, SW1/4, S1/2SE1/4	240.00
Section 13 (All)	640.00
Section 14 (All)	640.00
Section 15, NE1/4, N1/2NW1/4, SE1/4NW1/4, N1/2SE1/4, SE1/4SE1/4	400.00
Section 23, NE1/4, N1/2NW1/4, SE1/4NW1/4, NE1/4SE1/4	320.00
Section 24 (All)	640.00
Total	6,252.41 acres

Mineral Estate

Federal Mineral Estate (99%)	=	6,212.41 acres
*Coal Federal Mineral Estate (1%)	=	40.00 acres

Surface Estate

Federal Surface Estate (54.3%)	=	3,394.03 acres
Private Surface Estate (32.3%)	=	2,022.11 acres
State Surface Estate (13.4%)	=	836.27 acres

Note: The Key Raptor Area would be expanded to the west to include those federal lands which do not become developed within the Cave Gulch-Bullfrog-Waltman Project Area. It is noted that several years may pass before oil and gas development in the project area is completed. However, Sections 5, 8, N1/2NE1/4 of Section 17, Township 36 North, Range 86 West, 6th P.M., and the S1/2 of Section 33, Township 37 North, Range 86 West, 6th P.M. contain high-value raptor habitat, which would also be managed for long-term nesting production.

Existing oil and gas leases within the Key Raptor Area may be developed. Within the Key Raptor Area, surface development of existing oil and gas leases within 1/4- to ½-mile of raptor nests would be subject to seasonal restrictions unless or until field development is proposed. When oil and gas field development is proposed in the Key Raptor Area, the year-round buffer, increased seasonal buffer, and unusual maintenance stipulations would have to be evaluated in an environmental assessment and selected in the decision document before being implemented.

Future oil and gas leases would be subject to No Surface Occupancy (NSO). Lands within the Key Raptor Area would be withdrawn from operation under the 1872 Mining Law, so that locatable minerals would not be subject to claim and development. The Key Raptor Area would be identified as an avoidance area for development of saleable minerals.

No right-of-way corridors would be designated within the Key Raptor Area. Rights-of-way would be considered for facilities necessary to support authorized development of existing oil and gas leases or other authorized uses. These rights-of-way must be placed alongside existing facilities

in corridor fashion. The Key Raptor Area would be identified as an avoidance area for rights-of-way. The right-of-way corridor designated in the PRRA RMP along U.S. Highway 20-26 would remain up to three miles wide, but would shift south to avoid the Key Raptor Area (Figure 2-13).

Management of grazing would include emphasis on improving range conditions to benefit raptor nesting. Grazing management plans for grazing leases which include lands within the Key Raptor Area would include management objectives to improve raptor habitat.

The Key Raptor Area would be identified as an avoidance area for roads or other improvements that would provide for increased human activities.

Casual uses, such as those associated with recreation, would not be managed specifically, unless there were documented disturbances to raptor nesting. The Key Raptor Area would be identified as an avoidance area for intensive recreation use or development.

The technical requirements for Alternative B, including the project-wide mitigation measures, are the same as described for the Proposed Action. The construction of this alternative would involve 313.50 acres of drill site disturbance, 256.86 acres of combined new road and pipeline disturbance, 163.35 acres of cross-country pipeline disturbance, and 35 acres of ancillary facility disturbance, for a total of approximately 768.71 acres (Table 2-7). A large portion of this area would be reclaimed as described under the Proposed Action, thus reducing the total disturbance by 420.28 acres to 348.43 acres (55 percent reduction).

2.5 ALTERNATIVE C - NO ACTION

The regulations implementing Section 1502.14(d) of the National Environmental Policy Act (NEPA) requires that the alternatives analysis in the EIS "include the alternative of no action" (43 CFR 1502.14 (d). For this project, the No Action Alternative is denial of the drilling and development proposal as submitted by the Operators. However, the Department of the Interior's authority to implement a "No Action" alternative which precludes drilling by denying the process is limited. An explanation of this limitation and the discretion the Department has in this regard is as follows:

An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease (Form 3110-2). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, restrictions are imposed on the lease terms.

The Tenth Circuit Court of Appeals in Sierra Club vs. Peterson (717 F. 2d 1409, 1983) found that "on land leased without a No Surface Occupancy stipulation, the Department cannot deny the permit to drill...once the land is leased the Department no longer has the authority to preclude surface disturbing activity even if the environmental impact of such activity is significant. The Department can only impose mitigation measures upon a lessee who pursues surface disturbing exploration and/or drilling activities". The court goes on to say "notwithstanding the assurance that a later site specific environmental analysis will be made, in issuing these leases the Department has made an irrevocable commitment to allow some surface disturbing activities, including drilling and road building".

Table 2-7. Alternative B Disturbances (in Acres).

Planning Area or Section Number; Well Spacing	Estimated No. & Type of Proposed Well Pads	Pad Disturbance[1]	Road Disturbance[2]	Cross-Country Pipeline Disturbance[3]	Total Disturbance Per Planning Area or Section Number
160-Acre Spacing	21 Single	21 x 2.75 = 57.75	21 x 3.64 = 76.44	21 x 2.42 = 50.82	185.01
80-Acre Spacing	32 Single	32 x 2.75 = 88.00	32 x 1.94 = 62.08	32 x 1.21 = 38.72	188.80
40-Acre Spacing	30 Single	30 x 2.75 = 82.50	30 x 1.94 = 58.20	30 x 1.21 = 36.30	177.00
20-Acre Spacing	31 Single	31 x 2.75 = 85.25	31 x 1.94 = 60.14	31 x 1.21 = 37.51	182.90
Ancillary Facilities	--	--	--	--	35.00
TOTAL	**114**	**313.5**	**256.86**	**163.35**	**768.71**

1 - Average pad disturbance of 2.75 acres is assumed; where existing wells are expanded for twinning, additional average pad disturbance of 0.8 acres is assumed.

2 - Roads = 40 feet wide; lengths vary per well pad according to well spacing: 160-acre spacing = 0.75 mile; 20/40-acre spacing = 0.4 mile; 320/640- acre spacing = 0.5 mile.

3 - Pipelines = 40 feet wide; lengths vary per well pad according to well spacing: 160-acre spacing = 1.5 miles, of which 1.0 mile would be constructed within access road; 20/40-acre spacing = 0.5 mile, of which 0.25 mile would be constructed within access roads; 320/640- acre spacing = 1.5 miles, of which 1.0 mile would be constructed within existing/new access roads.

Leases within the Cave Gulch-Bullfrog-Waltman Project Area contain various stipulations concerning surface disturbance, surface occupancy and limited surface use. In addition, the lease stipulations provide that the Department of the Interior may impose "such reasonable conditions, not inconsistent with the purposes for which (the) lease is issued, as the (BLM) may require to protect the surface of the leased lands and the environment". None of the stipulations, however, would empower the Secretary of the Interior to deny all drilling activity because of environmental concerns.

Provisions in leases that expressly provide Secretarial authority to deny or restrict APD development in whole or in part would depend on an opinion provided by the U.S. Fish and Wildlife Service (FWS) regarding impacts to endangered or threatened species or habitats of plants or animals that are listed or proposed for listing (e.g., bald eagle). If the FWS concludes that the proposed action and alternatives would likely jeopardize the continued existence of any endangered or threatened plant or animal species, then the APD(s) and Cave Gulch-Bullfrog-Waltman development may be denied in whole or in part.

Based on the above explanation, this alternative would deny the proposal as submitted but would allow consideration of individual APDs on federal lands on a case by case basis through individual project and site-specific environmental analysis. Evaluation of transportation of natural gas products would also be considered on a case by case basis. Additional gas development could occur on State and private lands within the project area under APDs approved by the WOGCC.

2.6 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

As discussed in this Chapter (Section 2.1), the proposed action of drilling and developing 200 natural gas well locations was determined by the Operators through geologic interpretations of subsurface structures in the project area and adjacent lands. Drilling estimations were based on full development of the Cave Gulch-Bullfrog-Waltman Project Area on established unit spacing for the Cave Gulch and Waltman Units, except, to protect correlative rights where the Bullfrog and Cave Gulch Unit Areas are contiguous. In that case development would be consistent with that established for the Cave Gulch Unit under Rule 302 or one well per 40-acre drilling unit.

Alternatives to the Proposed Action, were determined through the scoping process and BLM management concerns, and included the need for a more defined location of proposed facilities, including well sites, roads, pipelines, and other ancillary facilities; and natural gas development alternatives that better addressed potential impacts to raptors and their habitats. Alternatives considered but not analyzed in detail included the following:

- Designate the project area as an Area of Critical Environmental Concern (ACEC), with no further (or limited additional) mineral development. An ACEC constitutes a management designation through the land use planning process, and identifies a commitment to manage the designated area in such a way as to emphasize the designated values. (For the Cave Gulch-Bullfrog-Waltman project area, the designated values would be management of raptor habitat). By itself, designation of the project area as an ACEC does not constitute an alternative to the Proposed Action. As a result this alternative was not further evaluated in detail.

- Develop the gas resources without applying seasonal raptor management restrictions. Direct impacts to raptors while they are nesting could occur. This would be an unauthorized taking. The taking of any migratory bird, or bald or golden eagle, or the nest or eggs of any migratory bird, or bald or golden eagle, without a permit, would be in violation of Federal Law. As a result, this alternative was not further evaluated in detail.

- An alternative to removal of liquid hydrocarbons at the proposed liquids recovery plant is to transport these liquids by pipeline for processing at another location. The KN Energy Pony Express Pipeline (Figure 1-2), once operational, could transport the "wet" gas for processing at KN's Douglas, Wyoming plant. A new CIG pipeline could be constructed to transport the gas to Rawlins for processing. Under this scenario. the pipeline company(s) would gain the economic benefits from sale of the liquids removed. Under the Proposed Action, the operators would gain the economic benefits. Decisions on how, or if, liquid hydrocarbons are to be recovered before the natural gas is transported to market are based primarily on economics.

  The BLM has no authority to require recovery of the liquids, or to specify the manner in which recovery would occur. No BLM authorization would be required if KN transported the gas to their Douglas plant, and there is no proposal before the BLM for a new CIG pipeline. Therefore, further consideration of this alternative is not warranted at this time. However, should the operators choose not to pursue the recovery plant, the opportunity for a future new pipeline, or use of the existing pipeline does exist. A new pipeline would require further NEPA analysis.

2.7 COMPARISON OF FIELD DEVELOPMENT ALTERNATIVES

Well spacing is nearly identical for the Proposed Action and Alternatives A and B. Sections 30, 31, and 32 of Township 37 North, Range 86 West would be developed on 20-acre spacing (with 40-acre surface spacing). The area immediately surrounding Sections 30, 31, and 32 would be developed on 40-acre surface and downhole spacing. An area outside the 40-acre surface/downhole spacing would be developed on 80-acre surface and downhole spacing. The remainder of the reservoir area would be developed on 160-acre surface and downhole spacing. Deeper wells would also utilize expanded common well pads where possible and would likely be on 320 or 640-acre spacing.

A larger area of development is addressed under Alternatives A and B because the development area for the alternatives is based on the Wyoming Reservoir Management Group Final Geologic, Well Spacing, and Evaluation Report (WRMG June, 1996), with its associated geologic and reservoir boundary. A smaller area of development is addressed under the Proposed Action because the development area is based on the Wyoming Reservoir Management Group Preliminary Report (WRMG February, 1996) geologic and reservoir boundary (Figures 2-14 and 2-15).

The Proposed Action within the project area would involve development of 84 well pads and facilities on approximately 11,489 acres in the four Planning Areas (Figure 2-14) described in Section 2.1.1 (Proposed Action) of this EIS. Under the Proposed Action, Area 1 encompasses

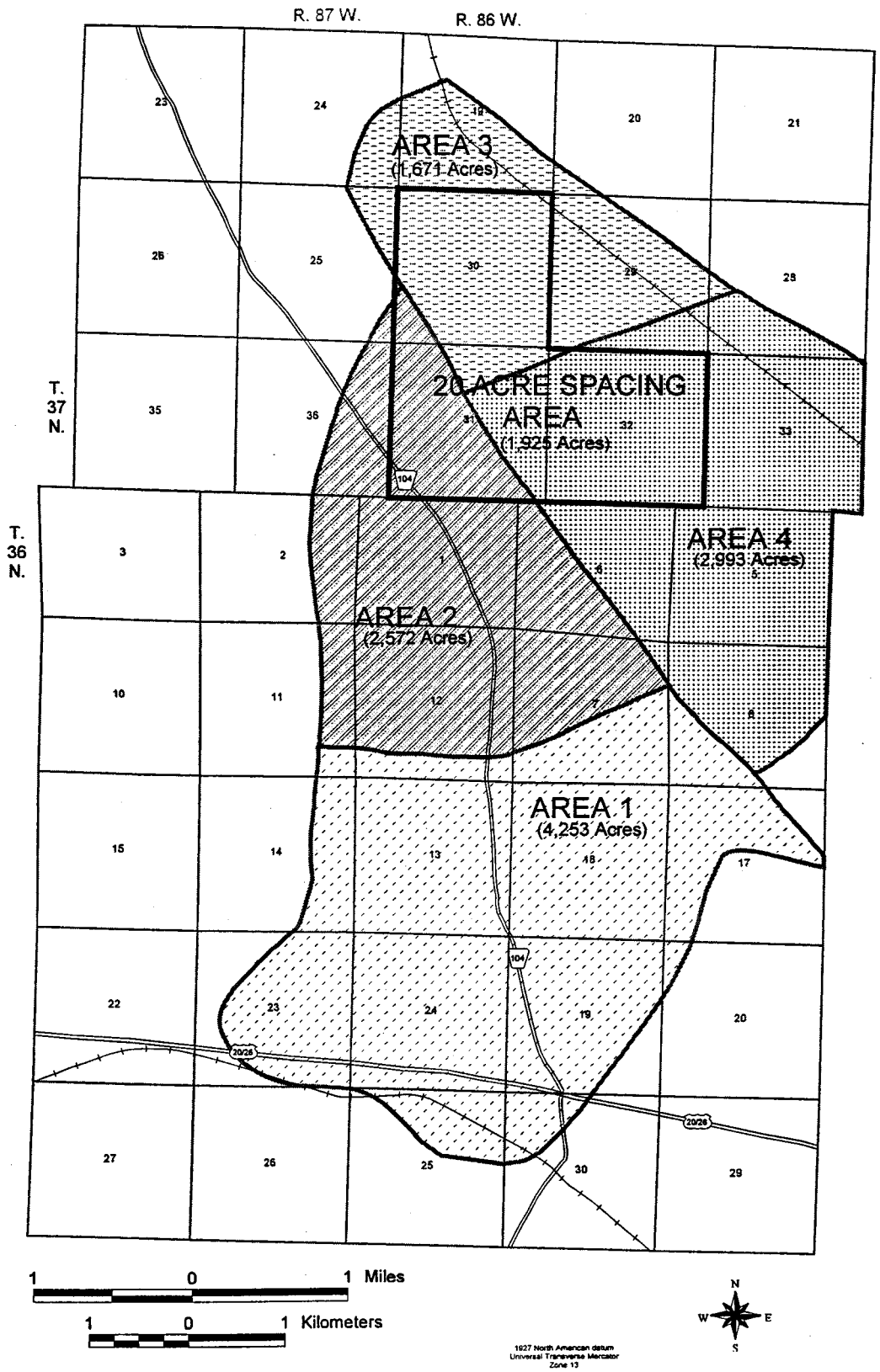


Figure 2-14. Operators' Planning Areas Shown Under the Proposed Action.

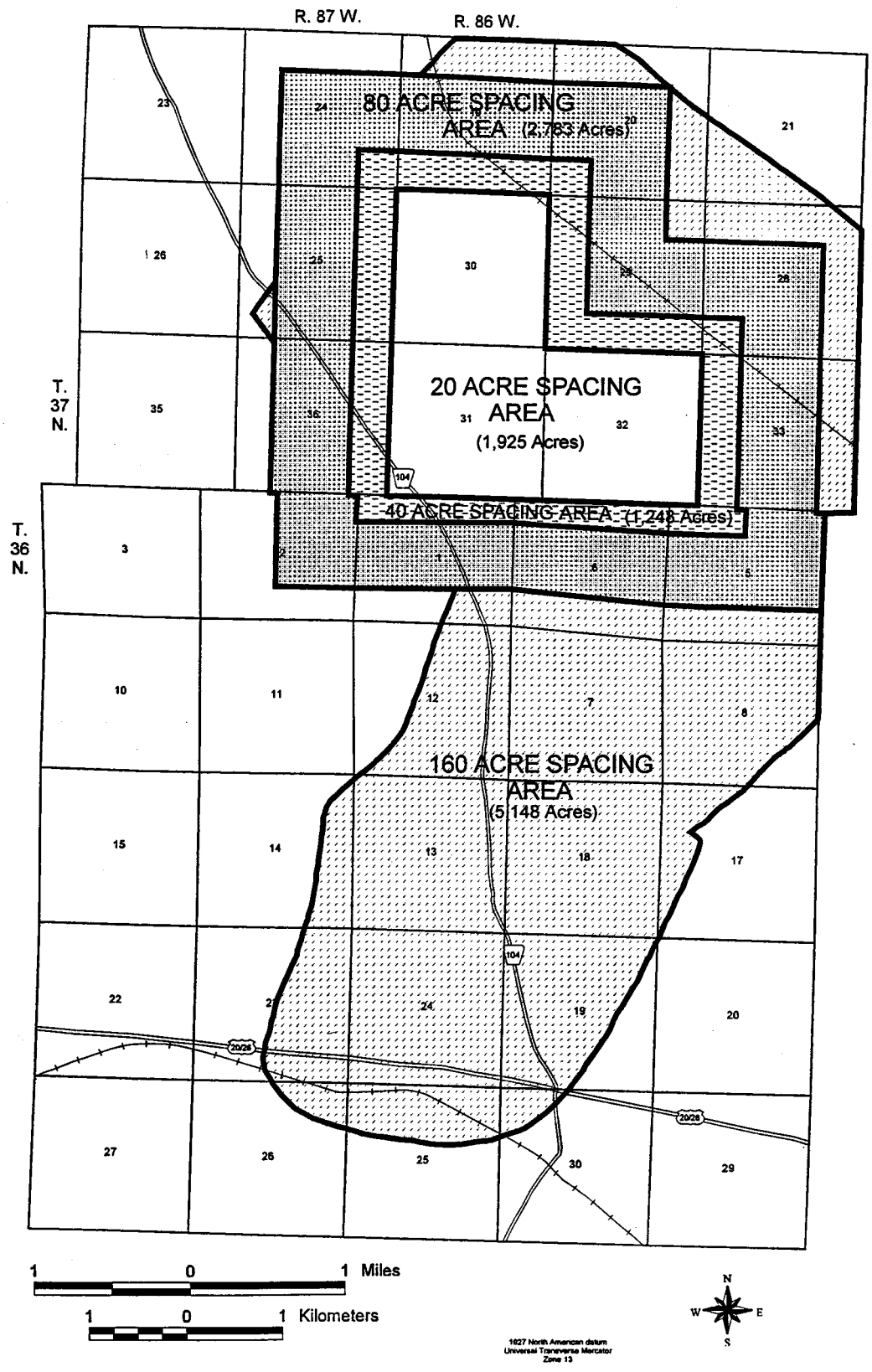


Figure 2-15. BLMs' Spacing Areas as Shown for Alternatives A and B.

4,253 acres; Area 2 has 2,572 acres; Area 3 has 1,671 acres; and Area 4 contains 2,993 acres. Development of an additional 23 deep horizon test well pads could occur within the four planning areas, or anywhere on the remaining 13,604 acres within the project area (107 total well pads).

Alternatives A and B would involve development of approximately 12,105 acres in the four Planning Areas within the project area (Figure 2-15). Under Alternatives A and B, the 20-acre spacing area encompasses 1,925 acres; the 40-acre spacing area has 1,249 acres; the 80-acre spacing area has 2,783 acres; and the 160-acre (and over) spacing area has 6,148 acres. Alternative A includes 21 well pads on 20-acre spacing; 27 well pads on 40-acre spacing; 30 well pads on 80-acre spacing; and 21 well pads on 160-acre spacing (99 total wells). Alternative B includes 31 well pads on 20-acre spacing; 30 well pads on 40-acre spacing; 32 well pads on 80-acre spacing; and 21 well pads on 160-acre spacing (114 total wells). Under Alternatives A and B, no well pads would be developed on the remaining 12,988 acres within the project area.

Each development alternative would involve clearing land and constructing well sites, access roads, pipelines, and associated facilities. The average for new well site disturbance is estimated to be 2.75 acres for a single, twin, and deep-well drill pads, which would range in size from 2.01 acres to 3.10 acres depending on site conditions. The average disturbance for enlarging existing single well pads, to allow a new well (twin), is estimated to be 0.80 acre, based on a maximum well pad expansion of 100 feet by 350 feet to allow for site conditions.

New road construction necessary to access each new well site is estimated at 0.4 mile per road on 20 to 80-acre spacing, or approximately 1.94 acres per well. New roads for new wells on 160-acre spacing are estimated at 0.75 mile per well site, or approximately 3.64 acres per well. New roads for new wells on 320 to 640-acre spacing are estimated at 0.50 mile per well site, or approximately 2.42 acres per well. The disturbance width of all new roads is estimated at 40 feet.

Pipelines that would be routed along new roadways are included in the estimated roadway disturbance width of 40 feet, and lengths are estimated at 0.25 mile where wells are 20 to 80-acre spacing, and at 1.0 mile where wells are 160 to 640-acre spacing. Pipelines that would be cross-country are estimated to require a 40-foot width, and a length of 0.25 mile where wells are 20 to 80-acre spacing, and 0.5 mile where wells are 160 to 640-acre spacing. As such, new pipeline construction to each well site is estimated to impact 1.21 acres where wells are 20 to 80-acre spacing, and 2.42 acres where wells are 160 to 640-acre spacing.

Given these estimated disturbance areas, the Proposed Action would effect approximately 313.45 acres for well sites, 256.02 acres for access roads, and 183.92 acres for pipelines. Alternative A would effect approximately 268.35 acres for well sites, 223.88 acres for access roads, and 142.78 acres for pipelines. Alternative B would effect approximately 313.50 acres for well sites, 256.86 acres for access roads, and 163.35 acres for pipelines. An estimated 35 acres of ancillary facilities disturbance would occur under the Proposed Action and both alternatives.

Table 2-8 presents the total disturbance associated with new well pads, enlarged well pads, and new roads and pipelines in the project area for the Proposed Action, Alternative A, and Alternative B. A comparison of new disturbances and reclaimed area associated with the Proposed Action and Alternatives A and B is presented in Table 2-9.

Table 2-8. Total Disturbance (in Acres) by Spacing Density Associated with the Proposed Action, Alternative A, and Alternative B.

	Proposed Action			Alternative A		Alternative B	
Spacing (ac)	**20/40**	**160**	**320/640**	**20 - 80**	**160**	**20 - 80**	**160**
New Pads (ac)	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Roads (ac)	1.94	3.64	2.42	1.94	3.64	1.94	3.64
Pipelines (ac)	1.21	2.42	2.42	1.21	2.42	1.21	2.42
Total Dist./ Well (ac)	5.9	8.81	7.59	5.9	8.81	5.9	8.81
No. New Wells	62	22	23	76	21	93	21
Total Disturbance (ac)	365.8	193.82	174.57	448.40	185.01	548.70	185.01
Enlarged Pad Dist. (ac)*	0.8	----	----	0.8	----	----	----
No. Enlarged Pads	24	----	----	2	----	----	----
Total Enlarged Area (ac)	19.2	----	----	1.6	----	----	----
Total Disturbance (ac)	385.0	193.82	174.57	450.0	185.01	548.70	185.01
Ancillary Facilities (ac)		35.00		35.00		35.00	
TOTAL DISTURBANCE	**Proposed Action = 788.39**			**Alternative A = 670.01**		**Alternative B = 768.71**	

*No road or pipeline disturbance associated with enlargment of existing well pads.

Table 2-9. Comparison of Disturbance and Reclamation Acreages for the Proposed Action and Alternatives A and B.

	Proposed Action	Alternative A	Alternative B
New Disturbance			
Well Pads	313.45	268.35	313.50
Access Roads	256.02	223.88	256.86
Cross-country Pipelines	183.92	142.78	163.35
Ancillary Facilities	35.00	35.00	35.00
TOTAL	**788.39**	**670.01**	**768.71**
Reclaimed Area			
Well Pads	82.45	108.25	128.00
Access Roads	128.01	111.94	128.43
Cross-country Pipelines	183.92	142.78	163.35
Ancillary Facilities	0.00	0.00	0.00
TOTAL	**394.38**	**362.97**	**420.28**
Remaining Area Not Reclaimed	**394.01**	**307.04**	**348.43**