TRC Mariah Associates Inc.

# ADDENDUM TO FINAL

# SEAWEST/KENETECH WINDFARM DEVELOPMENT COMPARISON, CARBON COUNTY, WYOMING

*Presented to*

**Bureau of Land Management**
Rawlins, Wyoming

*Presented by*

**TRC Mariah Associates Inc.**
Laramie, Wyoming

November 1997

**FINAL**

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**MAI Project 21541**

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## 1.0 INTRODUCTION

This is an addendum to the SeaWest/KENETECH Windfarm Development Comparison, Carbon County, Wyoming (BLM 1997). The purpose of this addendum is to provide proposed Phase I as-built data based on the final selection of the Mitsubishi Heavy Industry (MHI) MWT-450 600-kW wind turbine for Phase I development. Whereas the Development Comparison used a range of values for Phase I impact comparisons, including turbine sizes ranging from 500 to 750 kW, this addendum presents Phase I data based solely on the MHI MWT-450 600-kW wind turbine.

There are no changes to the data for the overall 500-MW project analyzed in the KENETECH/PacifiCorp Windpower Project Environmental Impact Statement (EIS). All changes noted in this addendum relate only to Phase I; Phase I as-built characteristics are within the scope of the characteristics analyzed in the EIS and the Development Comparison.

This addendum discusses only those aspects of Phase I that have become more specific or have changed as a result of selecting the MHI MWT-450 600-kW wind turbine. For this reason, most of the discussion focuses on Chapter 2.0 (Proposed Action and Alternatives) of the Development Comparison to refine the details of the Proposed Action based on selection of the MHI MWT-450 600-kW wind turbine.

In nearly all aspects, data for the MHI MWT-450 600-kW wind turbine fall within the range of values for 500 to 750 kW wind turbines analyzed in the Development Comparison. As a result, very few changes arise as a consequence of selecting the MHI MWT-450 600-kW wind turbine. However, having a single set of values, as opposed to a range of values, will simplify future assessment of cumulative impacts as the windfarm is developed.

For ease of use, this addendum lists only the changes in text and figures. To facilitate review, it uses the same section numbering format as the Development Comparison. There are no changes in the content of any section in the Development Comparison except as set forth in this addendum, below, under the same section number.

The following sections in the Development Comparison had no changes:

Sections 1.1, 1.2, 2.1.2, 2.1.3.3, 2.1.3.4, 2.1.4, 2.1.4.1, 2.1.4.2, 2.1.4.4, 2.1.4.5, 2.1.4.6, 2.1.4.7, 2.1.5, 2.1.6, 2.1.7, 2.1.8, 2.1.9, 2.1.10, 2.3, 2.4, 3.0, 3.1, 3.1.2, 3.1.3, 3.2, 3.2.3, 3.2.3.1, 3.2.3.2, 3.2.3.4, 3.2.3.5, 3.4, 3.6, 4.0, 4.1, 4.2, and Appendix A.

## 2.0 PROPOSED ACTION AND ALTERNATIVES

*Paragraph 2, Sentence 3:* Phase I of development under the SeaWest proposal would include 133 WTGs (compared with KENETECH's 201 WTGs).

*Paragraph 3, Sentence 1:* The total acreage of new disturbances expected under Phase I of the Proposed Action for the SeaWest proposal would be 79 acres for the life-of-project (LOP) (Tables 2.1a and 2.1b).

### 2.1 PROPOSED ACTION

*Entire text:* SeaWest will purchase MHI MWT-450 600-kW wind turbines for Phase I from MHI. Turbine specifications are presented in Table 2.3. The final site plan is governed, in part, by the maximum output of the MHI MWT-450 600-kW wind turbine and by the build-out of Phase I to 133 wind turbines. Map 2.1 has been amended to show the site plan using the MHI MWT-450 600-kW wind turbine. Map 2.2 (750-kW wind turbine siting) has been deleted. Map 2.3 shows the site plan for KENETECH's proposed Phase I development using the KVS-33 400-kW turbine.

Table 2.1a Types and Acreages of Proposed Disturbance, Phase I, As-Built.

| | KENETECH Proposal (acres) | | SeaWest Proposal (acres) | | SeaWest As-Built | |
|---|---|---|---|---|---|---|
| Disturbance Type | Initial | LOP | Initial | LOP | Initial | LOP |
| **Windfarm** | | | | | | |
| Turbine strings (pads, trenches, staging areas, communication structures, meteorological towers, and roads) | 136 | 64 | 102-119 | 56-63 | 112 | 74 |
| O&M facility | <1 | <1 | Same | Same | 1 | 1 |
| Subtotal | 137 | 65 | 103-120 | 57-64 | 113 | 75 |
| **Substations** | | | | | | |
| Windfarm substations | 3 | 3 | Same | Same | Same | Same |
| Miner's substation expansion | 1 | 1 | Same | Same | Same | Same |
| Subtotal | 4 | 4 | Same | Same | Same | Same |
| **230-kV Transmission Line Route No. 3** | | | | | | |
| Transmission line ROW | 178 | 0 | Same | Same | Same | Same |
| Staging areas | 1 | 0 | Same | Same | Same | Same |
| Subtotal | 179 | 0 | Same | Same | Same | Same |
| Total disturbance (to nearest acre) | 320 | 69 | 286-303 | 61-68 | 296 | 79 |
| Disturbance per MW (Phase I)[1,2] | 5 | 1 | 4 | 1 | 4 | 1 |

[1] Other phases would involve less construction disturbance because transmission line construction would be complete.

[2] Disturbance per MW, KENETECH, equals total disturbance divided by 70.5. For the SeaWest proposal, disturbance area was divided by 68.25. For SeaWest as-built project, disturbance area was divided by 80.

Table 2.1b Assumptions Used to Compute Acreages in Table 2.1a, Phase I.

| Disturbance Type | Initial Disturbance | LOP Disturbance |
|---|---|---|
| **KENETECH** | | |
| Turbine corridor [length, mi (km)] | 6.3 (10.1) | 6.3 (10.1) |
| Average turbine corridor [width, ft (m)] | 120.0 (36.6) | 50.0 (15.2) |
| New road outside corridor [length, mi (km)] | 5.5 (8.9) | 5.5 (8.9) |
| New road outside corridor [width, ft (m)] | 48.0 (14.6) | 24.0 (7.3) |
| Overhead collection line [length, mi (km)] | 5.0 (8.0) | 5.0 (8.0) |
| Overhead collection line [width, ft (m)] | 20.0 (6.1) | 0 |
| Construction corridor [width, ft (m)] | 120.0 (36.6), reduced to 100.0 (30.5) in vicinity of cultural resources | 0 |
| Met towers [sq ft (sq m)] | 3,000.0 (278.7) | 70.0 (6.5) |
| O&M facility dimensions [ft (m)] | 150.0 x 200.0 (45.7 x 61.0) | 150.0 x 200.0 (45.7 x 61.0) |
| **SeaWest Proposed** | | |
| Turbine pad dimensions [ft (m)][1] | 100.0 x 100.0 (30.5 x 30.5) | 43.0 x 68.0 (13.1 x 20.7) |
| New roads outside turbine strings [length, mi (km)] | 5.5 (8.9) | 5.5 (8.9) |
| New roads outside turbine strings [width, ft (m)] | 48.0 (14.6) | 24.0 (7.3) |
| New roads alongside turbine strings [length, mi (km)][2] | 6.9 (11.1) | 6.9 (11.1) |
| New roads alongside turbine strings [width, ft (m)] | 48.0 (14.6) | 24.0 (7.3) |
| Turbine pad staging areas [sq ft (sq m)] | 1,900.0 (176.5) | 0 |
| Construction staging areas [ft (m)] | 150.0 x 300.0 (45.7 x 91.4) | 0 |
| Meteorological towers [sq ft (sq m)] | 6,000.0 (557.4) | 140.0 (13.0) |
| O&M facility dimensions [ft (m)] | 175.0 x 222.0 (53.3 x 67.7) | 175.0 x 222.0 (53.3 x 67.7) |

Table 2.1b (Continued)

| Disturbance Type | Initial Disturbance | LOP Disturbance |
|---|---|---|
| **SeaWest As-Built** | | |
| Turbine pad dimensions [ft (m)][1] | 100.0 x 100.0 (30.5 x 30.5) | 43.0 x 68.0 (13.1 x 20.7) |
| New roads outside turbine strings [length, mi (km)] | 5.5 (8.9) | 5.5 (8.9) |
| New roads outside turbine strings [width, ft (m)] | 48.0 (14.6) | 24.0 (7.3) |
| New roads alongside turbine strings [length, mi (km)][2] | 7.9 (12.7) | 7.9 (12.7) |
| New roads alongside turbine strings [width, ft (m)] | 48.0 (14.6) | 24 (7.3) |
| Turbine pad staging areas [sq ft (sq m)] | 1,900.0 (176.5) | 0 |
| Construction staging areas [ft (m)] | 150.0 x 300.0 (45.7 x 91.4) | 0 |
| Meteorological towers [sq ft (sq m)] | 6,000.0 (557.4) | 140.0 (13.0) |
| O&M facility dimensions [ft (m)] | 200.0 x 220.0 (61.0 x 67.1) | 200.0 x 220.0 (61.0 x 67.1) |

1 The term "corridor" does not apply to the SeaWest proposal--turbines are constructed in staging areas and within the turbine pad area. Pads are connected by roads (Figure 2.1).

2 Road ROWs include trenches for electrical and communication lines.

Table 2.3 Comparison of Windfarm Characteristics (Including Turbine Specifications), Electrical Systems, Communication Systems, and Access for Phase I.

| Attribute | KENETECH Proposal | SeaWest Proposal | SeaWest As-Built |
|---|---|---|---|
| **Windfarm Characteristics** | | | |
| Number of turbines | 201 | 91-136 | 133 |
| Location | See Map 2.3 in this addendum | See Maps 2.1 and 2.2 in Development Comparison | See Map 2.1 in this addendum |
| Phase I capacity | 70.5 MW | 68-68.25 MW | ≈ 80 MW |
| Tower height (hub height) | 80, 100, or 120 ft (24, 30, or 37 m) | 131-151 ft (40-46 m) | 131 ft (40 m) |
| Tower type | Tubular steel | Same | Same |
| Distance between towers | 162-216 ft (49-66 m) | 260-290 ft (79-88 m) | 276 ft (84 m) |
| Distance between strings | 1,080-1,620 ft (329-494 m) | 1,150-1,350 ft (351-411 m) | 1,150-1,350 ft (351-411 m) |
| Turbine maximum output | 400 kW | 500-750 kW | 600 kW |
| Rotor diameter | 108 ft (33 m) | 130-144 ft (40-44 m) | 138 ft (42 m) |
| Rotor-swept area | 9,161 sq ft (851 sq m) | 13,273-16,286 sq ft (1,233-1,513 sq m) | 14,957 sq ft (1,390 sq m) |
| Total swept area | 1,841,361 sq ft (171,072 sq m) | 1,482,026-1,805,128 sq ft (137,688-167,705 sq m) | 1,989,281 sq ft (184,815 sq m) |
| Tip speed | 154 mph (69 m/s) | 125-139 mph (56-62 m/s) | 118 mph (53 m/s) |
| Blade material | Reinforced fiberglass | Same | Same |
| Number of blades | 3 | Same | Same |
| Yaw system | Electrically controlled drive system | Same | Same |
| Turbine drive train | Mainshaft, gearbox, brake system | Same | Same |
| Hub | Cast iron | Same | Same |
| Number of turbine strings | 12 | 6-8 | 8 |
| Number of end row turbines | 24 | 12-16 | 16 |
| String length | 1,584-10,560 ft (483-3,219 m) | 2,030-8,320 ft (619-2,536 m) | 2,030-7,800 ft (619-2,379 m) |
| Turbine operating range | 10-65 mph (4-29 m/s) | Same | Same |
| Noise level at base of tower | 99.3 dBA | 99.2-100.0 dBA | 99.2-100 dBA |

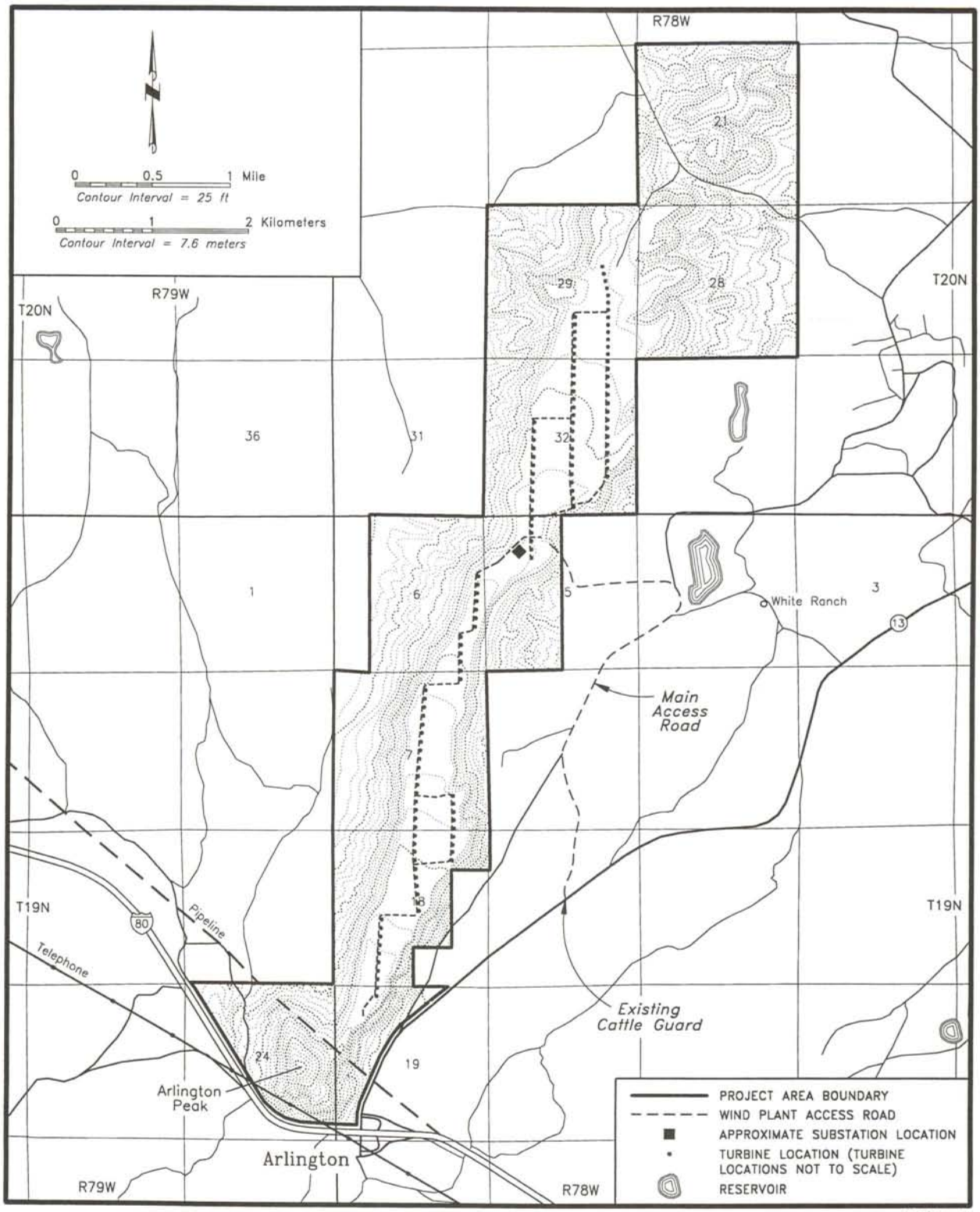
Table 2.3 (Continued)

| Attribute | KENETECH Proposal | SeaWest Proposal | SeaWest As-Built |
|---|---|---|---|
| **Windfarm Characteristics (cont.)** | | | |
| Turbine color | Standard BLM environmental color | Same | Same |
| Number of meteorological towers for LOP | 7 | 11-16 | 11 |
| O&M facility | <1 acre | Same | 1 acre |
| Turbine servicing | Uptower | Same | Same |
| Foundation | Buried, steel-reinforced, poured concrete | Same | Same |
| LOP | 30-year renewable ROW grant | Same | Same |
| **Electrical System** | | | |
| Transformer type | Padmount, 3-phase, oil-cooled (no PCBs)[1] | Same | Same |
| Number of transformers | 67-100 | 91-136 | 133 |
| Power control | Solid-state, computer-controlled | Same | Same |
| Low voltage electrical | Underground | Same | Same |
| Medium voltage electrical | Pole line | Underground | Underground |
| Number of power/riser poles within windfarm | 150 | 2 | 2 |
| Aboveground collection lines within windfarm | 5.0 mi (8.0 km) | 0 | 0 |
| Underground collection lines within windfarm | 6.3 mi (10.1 km) | 6.3-8.2 mi (10.1-13.2 km) | 7.3 mi (11.7 km) |
| Installed height of power poles | 45-55 ft (14-17 m) | Same | Same |
| Voltage from turbines | 480 volts | 550-690 volts | 600 volts |
| Transformer capacity | 750-1,250 kVA | 750-1,000 kVA | 600 kVA minimum |
| Medium voltage system | 34.5 kV | Same | Same |
| Transmission line | See Section 2.1.3.2 in DEIS | Same | Same |
| Substation location | Section 5, T78N, R19W | Same | Same |
| Number of conductors | 4, including 1 ground | Same | Same |
| Conductor spacing | At least 5 ft (2 m) apart | Same | Same |

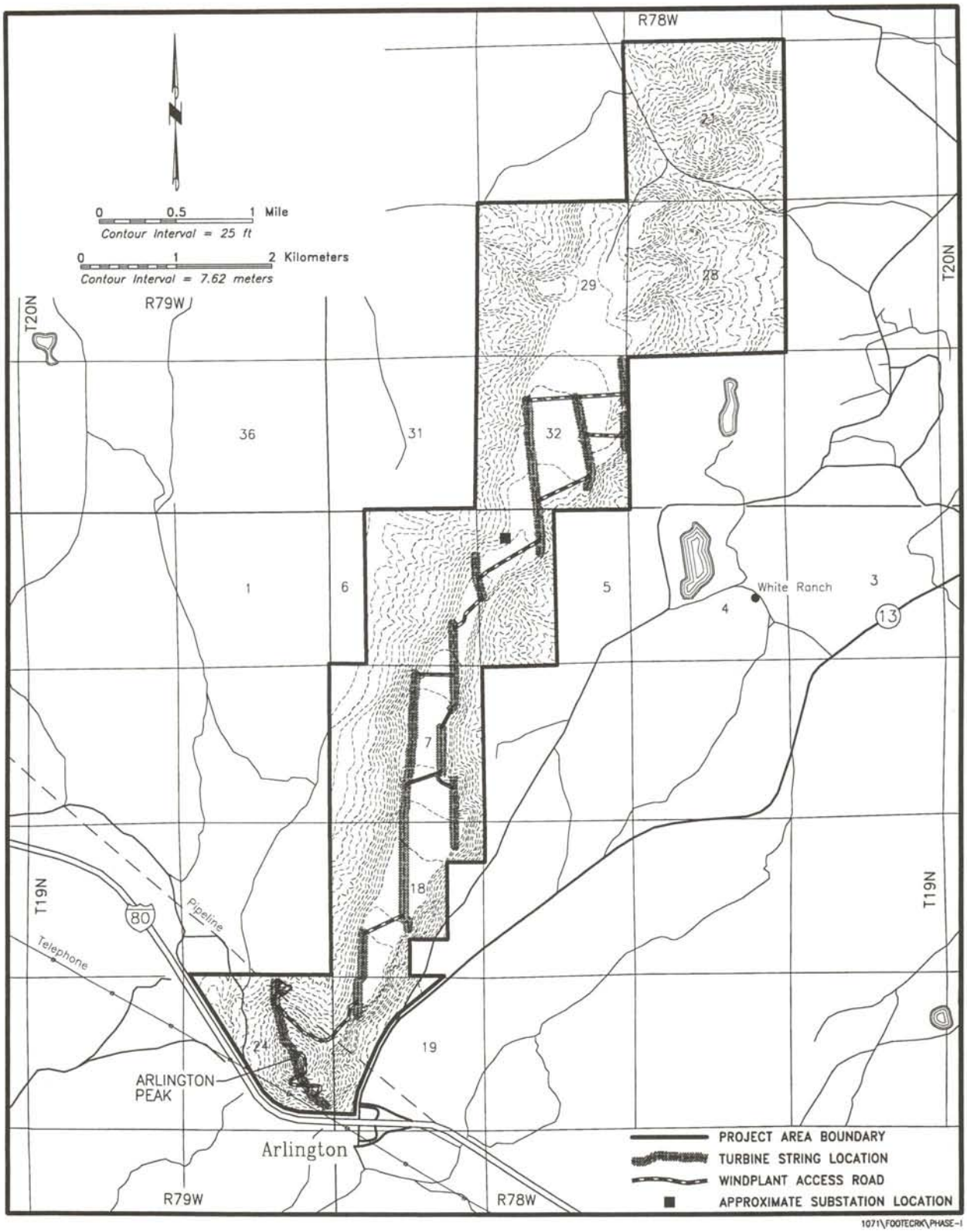
Table 2.3 (Continued)

| Attribute | KENETECH Proposal | SeaWest Proposal | SeaWest As-Built |
|---|---|---|---|
| **Communication System** | | | |
| Turbine control | Computer-controlled, proprietary software | Same | Same |
| Communications network | Buried cables centrally connected to O&M building | Same | Same |
| Disturbance due to communication system | Trench from rimtop to O&M building near Arlington; <1.0 acre | 0 | 0 |
| Trenching | Common trench with power collection lines | Same | Same |
| Number of communications buildings | 3 | 1 | 1 |
| Communication building dimensions | 8 x 8 ft (2 x 2 m) | 10 x 14 ft (3 x 4 m) | 10 x 14 ft (3 x 4 m) |
| **Access** | | | |
| Access | Via Interstate 80 and Wyoming Highways 30/287 and 13 | Same | Same |
| Main access road length | 3.4 mi (5.5 km) | Same | Same |
| Windfarm access road length | 10.8 mi (17.4 km) | 8.4 mi (13.5 km) | 9.5 mi (15.3 km) |
| ROW for main access road | 55 ft (17 m) | Same | Same |
| ROW for windfarm access roads | 50 ft (15 m) | Same | Same |

[1] PCB = polychlorinated biphenyl.




Map 2.1 Site Plan, MHI MWT-450 600-kW Turbine.




Map 2.3 Site Plan, KENETECH, Phase I, KVS-33 400-kW Turbine.

**2.1.1 Overview**

*Paragraph 4, Sentence 1:* The project would be constructed in phases of varying size, beginning with the Phase I erection of 133 turbines with an expected generating capacity of approximately 80 MW on Foote Creek Rim.

**2.1.3 The Windfarm**

*Paragraph 2:* At Foote Creek Rim, Phase I wind turbines would be placed along the rim in eight turbine strings (Map 2.1), whereas KENETECH had proposed 12 Phase I strings (BLM 1995c). String length would vary from 2,030 to 7,800 ft (619 to 2,379 m) as compared with string lengths of 1,584 to 10,560 ft (483 to 3,219 m) under the KENETECH proposal.

2.1.3.1 Wind Turbine Generators

*Paragraph 1, Sentences 4 and 5:* The operating range of windspeeds would be 10.7-60.4 miles per hour (mph) [4.8-27.0 meters per second (mps)]. At speeds greater than 60.4 mph (27.0 mps), the blades or blade tips would feather into the wind (they would turn parallel with the wind) and the rotor would stop spinning.

2.1.3.2 Electrical System

Windfarm Electrical System

*Paragraph 1, Bullets 1 and 2:*

- power from turbines would be 600 volts (compared with 480 volts for KENETECH's KVS-33);
- transformer capacity would be a minimum of 600 thousand volt amperes (kVA) (compared with 750-1,250 kVA for KENETECH);

2.1.4.3 Trenching and Placement of Underground Electrical and Communication Cables

*Sentence 2:* For Phase I, an estimated 133 transformers would be used to step up low voltage power to 34.5 kV and approximately 7.3 miles (mi) [11.7 kilometers (km)] of underground power cable would be installed.

**2.1.11 Project-wide Mitigation Measures**

*Paragraph 4:*

3) Because SeaWest would use a larger turbine than the KVS-33 proposed by KENETECH, fewer turbine strings and, consequently, fewer end row turbines would be erected. The SeaWest layout would include 16 end row turbines, whereas the KENETECH proposal included 24.

*Paragraph 5:*

4) For Phase I development, SeaWest is proposing to use 68 fewer turbines than the number proposed by KENETECH.

**2.2 ALTERNATIVE A**

*Paragraph 3, Sentence 1:* Under Alternative A, the project also would be developed in phases, beginning with the approximately 80-MW (133 turbines) Phase I on Foote Creek Rim, as described for the Proposed Action.

### 3.1.1 Snow Deposition

*Paragraph 4, Sentence 2:* The SeaWest proposal includes up to 66 more pad-mounted transformers than the KENETECH proposal, but does not include any downtower boxes (201 for the KENETECH proposal) and would have only one communication building; therefore, there would be 135 fewer structures to accumulate snow (Table 3.1).

### 3.1.4 Soils

*Paragraph 1, Sentence 2:* For Phase I, the SeaWest proposal would disturb approximately 24 fewer acres during construction and up to 10 acres more for the LOP, although disturbance per MW would be essentially the same as the KENETECH proposal (Tables 2.1a and 2.2a).

### 3.1.5 Noise

*Paragraph 3, Sentence 1:* SeaWest's Phase I proposal includes a 34% reduction in the number of turbines on Foote Creek Rim which would result in a 1.0 dBA reduction in noise levels across all noise contours shown on Map 4.2 in the DEIS (Table 3.2).

### 3.2.1 Vegetation

*Paragraph 1, Sentence 2:* For Phase I, the SeaWest proposal would disturb approximately 24 fewer acres of vegetation during construction and up to 10 acres more for the LOP, although disturbance per MW would be essentially the same as for the KENETECH proposal (Tables 2.1a and 2.2a).

Table 3.1 Comparison of Project Components that Would Influence Snow Distribution.

| Snow Accumulation Factor | KENETECH[1] Proposal | SeaWest[2] Proposal | SeaWest As-Built | Snow Accumulation under SeaWest Proposal as Compared with KENETECH Proposal |
|---|---|---|---|---|
| Individual turbine rotor-swept area | 9,161 sq ft (851 sq m) | 13,273-16,286 sq ft (1,233-1,513 sq m) | 14,957 sq ft (1,390 sq m) | Increased accumulation |
| Distance between turbines | 162-216 ft (49-66 m) | 260-290 ft (79-88 m) | 276 ft (84 m) | Decreased accumulation |
| Ratio of disturbed: undisturbed air | 0.42 | 0.21 to 0.25 | 0.25 | Decreased accumulation |
| Estimated drag coefficient | 0.5 | Same | Same | No difference |
| Tower height | 80, 100, 120 ft (24, 30, or 37 m) | 131-151 ft (40-46 m) | 131 ft (40 m) | Increased accumulation further downwind |
| Overall effect of WTG array on snow accumulation | The affected area would be located 3.7 rotor diameters downwind of WTG string; drifts from individual turbines would coalesce 4.0 rotor diameters downwind | The affect area would be located approximately 6 rotor diameters downwind of WTG strings; drift from individual turbines would coalesce 6 to 8 rotor diameters downwind | Same as SeaWest Proposal | Overall reduction in drift formation on Foote Creek Rim, since affected area would not reach the ground for approximately 50% of the turbines |
| Number of pad-mounted transformers | 67-100 | 91-136 | 133 | Increased development of up to 69 isolated drifts |
| Number of downtower facilities | 201 | 0 | Same as SeaWest Proposal | Decreased development of 201 isolated drifts |
| Road design | Crowned-and-ditched on rim top | Crowned without ditches on rim top | Same as SeaWest Proposal | Decreased accumulation downwind on roads |
| Road placement | Downwind of turbines | Upwind of turbines | Same as SeaWest Proposal | Decreased need for snow-plowing and less accumulation due to plowing-related drifts |
| Snow-plowing methods | High speed, wing-type plow | Same | Same | No difference, but decreased snow-plowing required |

[1] Tabler and Associates (1994).
[2] SeaWest (1997).

Table 3.2 Predicted Noise Levels at Existing Noise-Sensitive Areas, Phase I.

| Location | Estimated Existing Ambient Noise Level | KENETECH Predicted Noise Level | SeaWest 600-kW Turbine | |
|---|---|---|---|---|
| | | | Predicted WTG Noise Level | Existing Plus WTG Noise Level |
| Wyoming Highway Department residences | 59 dBA | 50-55 dBA | 50 dBA | 59 dBA |
| KOA campground | 55-60 dBA | 52 dBA | 48 dBA | 55-60 dBA |
| Sage grouse leks | 50-55 dBA | 27 dBA | 25.5 dBA | 50-55 dBA |

### 3.2.2 Big Game

*Paragraph 1, Sentences 2 and 3:* Phase I disturbance in pronghorn, mule deer, white-tailed deer, and elk winter/yearlong range would be reduced by 24 acres during construction and increased approximately 10 acres for the LOP, although Phase I disturbance per MW would be essentially the same as the KENETECH proposal (Tables 2.1a and 2.1b). Furthermore, whereas KENETECH proposed to construct during winter months, SeaWest's Phase I development would be constructed in the fall of 1997 and spring/summer/fall of 1998, and thus no additional mitigation for wintering wildlife would be necessary.

#### 3.2.3.3 Comparison of Project Design Features Related to Mitigation of Impacts to Avifauna

1) *The size and physical configuration of the windfarm...*

*Paragraph 1, Sentence 1:* Sea West proposes to use 68 fewer turbines than was proposed by KENETECH.

*Paragraph 3, Sentences 2 and 3:* Under SeaWest's proposal, 12 of 133 turbines would be located within 164 ft (50 m) of the rim's edge, compared with 69 of 174 turbines--the

number proposed for the actual rim by KENETECH, but excluding the 27 turbines proposed by KENETECH for Arlington Peak. Under the SeaWest proposal and as-built, no turbines would be located on Arlington Peak (also an apparent high-use area) during Phase I.

*Paragraph 6, Sentence 2:* Risk to all birds would be reduced because SeaWest proposes to use 68 fewer turbines.

*Paragraph 7, Sentence 1:* SeaWest's site locations for the remaining 112 turbines proposed for future phases on Foote Creek Rim (see Section 2.1.1 in the Development Comparison) are unknown at this time and thus levels of risk associated with future project designs cannot yet be evaluated.

*Table 3.6:* Amended to show SeaWest as-built data.

2) *Larger swept areas contribute...*

*Paragraph 1, Sentences 3 and 4:* Total rotor-swept area for Phase I (number of turbines multiplied by rotor-swept area of each turbine) would be 147,920 sq ft (13,743 sq m) higher that than for the KENETECH proposal, which could result in slightly increased risk to all birds flying at rotor height because the total airspace occupied by rotors would be slightly greater. However, because the larger wind turbines produce greater power for a given swept area, the swept area per MW would be approximately 5% lower than for the proposed KENETECH windfarm (Table 3.7). *[the following is added text]* Since the SeaWest as-built project falls within the range of turbine numbers and rotor diameters analyzed in the Development Comparison, the equipment dimension changes are documented for future reference, but have not been used to refine the analysis, in the interests of minimizing confusion in the analysis. The conclusions of the analysis continue to be valid. Future analyses will use the as-built dimensions.

Table 3.6 Comparison of Number and Size of Safe Corridors Between Turbines.

| Proposed Development | No. of Corridors[1] | Individual Corridor Length [ft (m)] (distance from blade tip to tip) | Total Corridor Length [ft (m)] |
|---|---|---|---|
| KENETECH proposal | 173[2] | 54 (16) | 9,342 (2,847) |
| SeaWest proposal | 90-135 | 130-144 (39.5-44) | 12,960-17,440 (3,950-5,316) |
| SeaWest As-Built | 132 | 138 (42) | 18,216 (5,552) |

1 Number of turbines proposed for the rim top minus one equals number of corridors.
2 Assumes a 108-ft (33-m) rotor diameter with 162 ft (49 m) between towers. Includes only those turbines located on the rim top; does not include the 27 turbines proposed for Arlington Peak by KENETECH.

Table 3.7 Rotor-Swept Area.

| | KENETECH Proposal | SeaWest Proposal | | SeaWest As-Built |
|---|---|---|---|---|
| Attribute | 108-ft (33-m) Rotor [sq ft (sq m)] | 130-ft (40-m) Rotor [sq ft (sq m)] | 144-ft (44-m) Rotor [sq ft (sq m)] | 138-ft (42-m) Rotor [sq ft (sq m)] |
| Rotor-swept area/turbine | 9,161 (851) | 13,273 (1,233) | 16,286 (1,513) | 14,957 (1,390) |
| Total rotor-swept area, Phase I[1,2] | 1,841,361 (170,462) | 1,805,128 (167,706) | 1,482,026 (137,688) | 1,989,281 (184,815) |
| Rotor-swept area/MW generated[2] | 26,119 (2,427) | 26,449-26,546 (2,437-2,466) | 21,714-21,795 (2,017-2,025) | 24,866 (2,310) |

1 Based on 201 turbines for the KENETECH proposal, 136 turbines for the 130-ft (40-m) SeaWest turbine, 91 turbines for the 144-ft (44-m) SeaWest turbine, and 133 turbines for SeaWest as-built.
2 Based on a 70.5-MW Phase I for the KENETECH proposal, a 68- to 68.25-MW Phase I SeaWest proposal, and 80-MW Phase I for SeaWest as-built.

3) *Comparison of risks of turbine location...*

*Paragraph 1, Sentence 4:* Table 3.9 in the Development Comparison presented the results of an analysis to evaluate the apparent trade-off of moving turbines away from the rim's edge and decreasing total rotor-swept area versus increasing rotor height. For the SeaWest as-built project, total rotor-swept area is approximately 8% larger than for the KENETECH project; however, fewer turbines will be located within 164 ft (50 m) of the rim's edge. Table 3.9 presents an analysis of the apparent trade-offs of moving turbines away from the rim's edge versus increasing total rotor-swept area and rotor height.

These calculations show that SeaWest's as-built project would pose about the same or less risk to all raptors and to each raptor group. Risks to eagles would be 10-50% lower. Risk to buteos would be 10% higher to 40% lower. Risk to falcons and all raptors combined would be 10-50% lower. The assumptions and errors concerning this analysis described in the Development Comparison also apply to these computations.

Table 3.9 Comparison of Relative Risk Associated with Turbine Height and Rotor-Swept Area Versus Position on Foote Creek Rim, Phase I, 600-kW Turbine.

| Survey Year | Eagles | Buteos | Falcons | All Raptors |
|---|---|---|---|---|
| 1994/95 | 0.9 | 1.1 | 0.9 | 0.9 |
| 1995/96 | 0.5 | 0.6 | 0.5 | 0.5 |

6) *End row turbines...*

*Paragraph 1, Sentence 2:* The SeaWest layout would include 16 end row turbines, whereas the KENETECH proposal included 24.

7) *Fewer large turbines...*

*Paragraph 1, Sentence 1:* For Phase I development, SeaWest is proposing to use 68 fewer turbines than the number proposed by KENETECH.

9) *Electrical systems...*

*Paragraph 1, Sentence 2:* Under the SeaWest as-built project, all within-plant collection and communication lines [approximately 7.3 mi (11.7 km) of lines] would be buried, reducing or eliminating the potential for electrocution.

3.2.3.4 Summary

Golden and Bald Eagles. *Delete the following bullet:*

- total rotor-swept area would be lower,

Peregrine falcons. *Delete the following bullet:*

- total rotor-swept area would be lower,

## 3.3 SOCIOECONOMICS

*Paragraph 1, Sentence 5:* Phase I of the SeaWest proposal is approximately 9.5 MW larger than the Phase I development proposed by KENETECH.

### 3.5 VISUAL RESOURCES

*Paragraph 2, Sentence 1:* SeaWest's towers would be 11 ft (3 m) taller than the largest of those proposed by KENETECH; therefore, they would be visible from greater distances and the overall area of significant impacts in both the Foote Creek Rim and Simpson Ridge areas would increase.

*Paragraph 3, Sentence 4:* Under the SeaWest proposal, turbine strings would occupy 4.9 mi (7.9 km) along the rim, whereas the KENETECH proposal would have occupied 4.8 mi (7.7 km).

*Paragraph 4, Sentence 2:* Table 3.13 presents a comparison of the visible cross-section (i.e., the silhouette) of the Phase I SeaWest and KENETECH proposals and shows that the cross-sectional area occupied by SeaWest as-built project would be approximately the same to 20% less than the area occupied by the KENETECH proposal.

## 4.0 REFERENCES

U.S. Bureau of Land Management. 1997. SeaWest/KENETECH Windfarm Development Comparison, Carbon County, Wyoming. Prepared for U.S. Department of Interior, Bureau of Land Management, Rawlins, Wyoming, by TRC Mariah Associates Inc., Laramie, Wyoming. 105 pp. + append.

For other references, see BLM 1997.

Table 3.13 Comparison of Visual Cross Sectional Area, Phase I.

| | KENETECH Proposal | | | | | SeaWest Proposal | | | | SeaWest As-Built | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | WTG Nacelle | Blades (3) | Tower | Downtower Structure | Total | WTG Nacelle | Blades (3) | Tower | Total | WTG Nacelle | Blades (3) | Tower | Total |
| Height/length (ft) | 5.0 | 52.8 | 80.0-120.0 | 7.0 | -- | 10.67 | 60.39-63.03 | 131.2-151.8 | -- | 7.2 | -- | 131 | -- |
| Width (ft) | 7.45 | 3.55 | 8.33 | 10.0 | -- | 7.50-8.09 | 3.74-4.00 | 8.58-8.67 | -- | 8.2 | -- | 8.6[1] | -- |
| Area (sq ft) | 37 | 562 | 666-1,000 | 70 | 1,336-1,670 | 80-86 | 678-756 | 1,126-1,316 | 1,884-2,158 | 80.0 | 807 | 1,126 | 2,013 |
| No. of WTGs per Project | | | | | 201 | | | | 91-136 | | | | 133 |
| Total Area (sq ft) | | | | | 268,536-335,670 | | | | 179,634-280,976 | | | | 267,729 |

[1] Tower diameter ranges from 6.6 ft at the top to 10.5 ft at the base; average diameter is 8.6 ft.