

ENVIRONMENTAL SERVICES

LOCATION OF A OOO 4014 PIPELINE FACILITIES FACTORS CONSIDERED

SUBMISSION 6-1

NOVEMBER, 1981

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Foothills Pipe Lines (South Yukon) Ltd.

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ADDENDUM TO THE ENVIRONMENTAL IMPACT STATEMENT FOR THE YUKON SECTION OF THE ALASKA HIGHWAY GAS PIPELINE

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THE ALASKA HIGHWAY GAS PIPELINE PROJECT



WHITEHORSE: 308 STEELE STREET, WHITEHORSE, N.W.T., Y1H 2C5 CALGARY: 1600 - 205 FIFTH AVENUE, S.W., CALGARY, ALBERTA T2P 2V7 This document is one of a series of addenda prepared to meet information requirements placed on Foothills Pipe Lines (South Yukon) Ltd. by the Federal Environmental Assessment and Review Office. Addenda within the series are divided into seven sets of submissions dealing with separate subject areas:

- 1. Introduction to Addenda Submissions.
- 2. Project Description and Update for Addenda Submissions.
- 3. Alternative Routes.

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- 4. Geotechnical, Hydrological, Design Mode and Revegetation Issues.
- 5. Fisheries, Wildlife and Scheduling Issues.
- 6. Issues Related to Pipeline Facilities.
- 7. Other Issues.

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The Relationship Between Objectives Identified as Criteria in Selection of Compressor Station Sites Page

1.0 INTRODUCTION

In 1976, in its application to the National Energy Board, Foothills Pipe Lines (Yukon) Ltd. (the Project) described in general terms the locations of ancillary facilities associated with construction of the Alaska Highway Gas Pipeline in southern Yukon Territory. The Project had not proceeded past the preliminary design stage for these facilities at that point in time, a factor which precluded an environmental assessment of Subsequently, the Project prepared an Environmental facility locations. Impact Statement (EIS) which was submitted to the Federal Environmental Assessment Review (EAR) Office in 1979, in which the locations of compressor stations, construction camps and stockpile sites were documented and in which the impacts of these facilities were assessed. In its review of the EIS, the EAR Panel noted there were information gaps and deficiencies in the rationale for site selection of ancillary facilities, and noted a lack of information on the methods of compressor station operation specifically in reference to the prospects for ice-fog formation. The EAR Panel tabled the following deficiency statement with regard to the location of ancillary facilities: "The Panel requires information on the criteria and methodology, predicted impacts and mitigation measures considered in the siting of compressor stations, construction camps, material storage areas and cement fabrication plants". Following a series of meetings between the Northern Pipeline Agency (NPA), EAR Panel and the Project, the requirements of the Panel were clarified, and the Panel requested "a description of the methodology used to locate compressor stations", as well as "the rationale for the criteria used to locate pipeline facilities along the route", an update on proposed locations of facilities, and a description of potential environmental impacts and mitigation measures including the ice fog potential at compressor station sites". This document has been prepared in response to the latter request.

2.0 METHODS USED IN THE LOCATION OF PIPELINE FACILITIES

The term "pipeline facilities" as used in this submission refers to compressor stations, construction camps and storage sites where pipe and fuel will be stockpiled. Selection of locations for facilities rests primarily with the Project's engineering and construction groups. Within these large groups, smaller groups or individuals are assigned primary responsibility for selecting site locations. The Project's Environmental Services Department is part of the engineering group. As with other locational responsibilities within the Project, facility location is a multidisciplinary undertaking involving more than one group, department or division. That is, the process of site selection while assigned as a responsibility to one group or person involves input from others. Responsibility for involving the appropriate range of persons and interests rests with those given the primary responsibility for site selection.

2.1 COMPRESSOR STATION SITES

Within the Project organization, the Compression Engineering Group has primary responsibility for selection of compressor station sites. This group used a decision analysis procedure to select suitable sites for the location of compressor stations. The procedure chosen for decision making was systematic, blending facts and experience to arrive at a final decision through weighted judgment. The process used was based on the approach recommended by Kepner and Tregoe $(1965)^1$.

The selection analysis consisted of several distinct phases.

Kepner, C.H. and B.B. Tregoe. 1965. The rational manager; a systematic approach to problem solving and decision making. McGraw-Hill, New York.

Establishing and Classifying Objectives

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As a first step in site selection, a complete list of objectives to be satisfied to a relative degree was drawn up. These objectives were then classified into three categories in descending order of importance. The categories were "mandatory", "significant" and "minor". The classified objectives used in selecting compressor sites are presented in Table 6-1.1. The degree of importance of the objectives is illustrated in Figure 6-1.1.

In using the selection system, significant objectives were weighted to establish the position of each relative to the others within the group. Mandatory objectives were not weighted because the items must be satisfied for any site to be acceptable. Minor items were dropped from consideration because none was sufficiently important to influence the decision on site selection. Then, significant objectives were weighted on a scale of 1 to 10 where the least important objective was given a weight of 1 and the most important a weight of 10.

Developing Alternatives

The second step in the analysis was the identification of alternatives. Alternative sites were selected for the compressor stations on the basis of preliminary hydraulics and 1:50,000 scale route maps. In some cases only one site was selected for a station because of a combination of controlling factors including hydraulics, geography, and other projects.

Evaluation of Alternatives with Respect to the Objectives

After establishing objectives and identifying alternatives, evaluation of alternatives with respect to objectives followed. Each alterna-

TABLE 6-1.1

CLASSIFICATION OF OBJECTIVES FOR COMPRESSOR STATION SITE SELECTION

A. MANDATORY

Site Must:

- 1. Satisfy hydraulic design.
- 2. Possess acceptable foundation conditions.
- 3. Be compatible with existing land-use.
- 4. Be acceptable in socio-economic terms.
- 5. Be compatible with the pipeline alignment.

B. SIGNIFICANT

Site Should:

- 6. Be located in an area of low relief.
- 7. Possess good drainage.
- 8. Be in an area of low wildlife sensitivity.
- 9. Require a short access road.
- 10. Provide a setting which facilitates construction, and thus low construction costs - including additional pipeline costs if affected by station location.
- 11. Provide a setting which facilitates operation, and thus low operating costs including pipeline maintenance if affected by station location.
- 12. Be of low archaeologic significance.
- 13. Maintain the aesthetic quality of surrounding terrain.
- 14. Be close to water.
- 15. Ensure acceptable noise levels at nearest dwelling, campground or other inhabited area.
- 16. Be downstream of the highway or airstrips in relation to prevailing winter winds.
- 17. Be close to a borrow site.
- 18. Provide an area suitable for station expansion, if required.
- 19. Provide an area suitable for a construction camp.
- 20. Be located on terrain of low erodability.

C. MINOR

Site Should:

- 21. Provide an area suitable for a stockpile site.
- 22. Be located in an area where electric power is available.



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tive was tested against each of the mandatory and significant objectives. The mandatory objectives determined initially whether an alternative was retained or discarded. If retained, it was scored against each of the significant objectives. The numerical scoring was carried out judgmentally on a scale of 1 to 10 with the best alternative receiving the highest score. These scores reflected the way that each alternative performed against the specific objective. The scores did not reflect the relative importance of the objectives. The two rankings were combined by multiplying the objective weight by the alternative score to give the weight-score. The weightscores were added to provide total weight-scores for each alternative. The totals indicated the relative rankings for the alternatives.

Assessing the Adverse Consequences of Alternatives

Where more than two alternatives were considered, the two topranked alternatives were considered independently for possible future adverse effects on the bases of undesirable impact of an anticipated consequence, and on the probability that the consequences would occur. Examples of adverse consequences considered were flooding, system outage because of permafrost degradation, or excessive operations and maintenance costs. The impacts were weighted on a scale of 1 to 10, with 10 being the most serious consequence. The probabilities were estimated on a scale of 1 to 10, with 10 being the highest probability. A probability-seriousness factor was obtained by multiplying the two numbers for each consequence. The numbers were totalled for each consequence with the lowest number indicating the preferred alternative.

Final Site Selection

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The alternative performance-against-objective ranking was then weighed judgementally against the consequence rankings to arrive at the best site for each compressor station. This best site was the one that

provided the most favourable balance of advantage and disadvantage.

2.2 CONSTRUCTION CAMPS AND MATERIAL STORAGE AREAS

Responsibility for selection of construction camp and storage areas for the Project rests with the Construction Division. The procedure followed during selection of camps and storage areas was not as formal as the process employed for compressor stations, although a similar sequence of objective identification and evaluation was followed.

Two categories of objectives were identified, one group considered "mandatory", the other considered "significant". Mandatory objectives were that the site must:

- Have a level area of appropriate size to accommodate the facility; and
- Have soil or soil conditions appropriate to the facility (sandy or gravelly soils being preferred).

The significant objectives considered in evaluating potential construction camp and material storage areas were that the site should:

1. Be readily accessible from the Alaska Highway;

2. Preferably have been previously disturbed;

3. Not have legal encumbrances;

4. Not be environmentally sensitive; and

5. Be compatible with existing or potential land-uses.

For construction camps, the following two additional "significant" objectives were desirable:

- 1. The site should be located at a central point within the construction area it was to service; and that
- 2. A water source for camp use be nearby.

Camp and stockpile locations were selected with the objectives outlined above in mind, but did not involve the more elaborate weighting of variables used in selecting compressor sites.

2.3 CONCRETE FABRICATION PLANTS

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The requirements for concrete fabrication plants have not been assessed at this point in time. The need for such plants will not be identified until the final design stage, at which time such factors as the type of pipe-placement modes and lengths of each mode are known in detail, and the requirements for weighting of the standard burial and above-ground modes are assessed. Once the need has been defined, bids will be let for supplying concrete to the Project, and the ultimate location(s) of fabrication plant(s) will largely be at the discretion of successful bidders. Project control over the location of these facilities would be limited to prohibiting the siting of such plants at environmentally-sensitive locations. In selecting and using sites for concrete fabrication, contractors would be obliged to follow the Socio-economic and Environmental Terms and Conditions issued by the NPA, as a condition of any contract with the Project, and would, in addition, be subject to the Yukon Territorial Land-use Regulations.

3.0 FACILITY LOCATIONS

Compressor, construction camp and stockpile locations selected to date are listed below. While the listing is a complete one and represents the most likely location of sites, some locations are still being evaluated in light of Project changes. As an example, alternatives to the listed location for Compressor Station 315 are being considered as a result of requests for route relocation in the Whitehorse area.

Locations indicated are shown on 1:50,000 scale maps included with the Project Description document (Submission 2-1).

3.1 COMPRESSOR STATION SITES

Compressor Station No.	Kilometre Post	Station Name	
¹ STA-311	64.7	White River .	
STA-312	146.2	Donjek River	
¹ STA-313	214.2	Kluane Lake	
STA-314	294.6	Pine Lake	
¹ STA-315	378.3	Takhini River	
STA-321	456.0	Yukon River	
1STA-322	553.9	Teslin River	
STA-323	650.0	Mount Hazel	
¹ STA-324	739.2	Rancheria	

¹Constructed for initial operations.

Section Number	Construction Camp (KP)	Fuel Storage (KP)	Pipe Storage (KP)
1	18.2	21.5	21.5, 42.0
2	75.5	75.5	59.3, 75.5, 94.0
3	146.0	142.6	108.8, 146.0, 163.3
4	214.0	204.5	178.5, 204.5
Lake Crossing	214.0	204.5	219.5
5	262.5	278.2	250.4, 268.3, 281.7, 294.6
6	356.5		317.9, 332.2, 356.5, 373.0
7	440.0		405.0, 440.0
8	497.0		467.0, 486.0, 529.0
9	570.9	549.0	549.0, 570.9, 597.2
10	616.5	612.2	612.2, 642.0
11	686.0	698.0, 714.0	666.0, 686.0, 714.0
12	767.0	714.0	714.0, 746.5, 797.0
13	767.0	771.0	771.0, 816.0

3.2 CONSTRUCTION CAMPS AND MATERIAL STORAGE AREAS

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4.0 ENVIRONMENTAL ANALYSIS OF FACILITY LOCATIONS

The environmental implications of constructing compressor stations, construction camps or material storage sites at the locations outlined in Section 3 were assessed within the framework of the site selection process set out in Section 2. As noted, the primary responsibility for site selection rested with the Compression Engineering group for compressor stations and with the Construction Planning group for camps and storage sites. Each group depended upon the Environmental Services Department to supply appropriate advice within the site selection process.

For the Project in Yukon Territory, Environmental Services personnel reviewed each proposed facility site, and, based on completed or on-going field studies and on-site evaluations, reported on environmental concerns associated with any given site. In completing this task, the NPA'S Environmental Terms and Conditions were used as a basis for defining Upon completion of facility site evaluations, Environmental concern. Services personnel recommended mitigative measures for problem areas to minimize environmental impacts. In the early stages of the Project's development, recommendations included site relocation in extreme cases (i.e., Compressor Station 315 was moved from Haeckel Hill to the Takhini Burn area). However, facility sites described in this submission and Submission 2-1 have been judged to be acceptable from an environmental point of view. Recommended mitigation is restricted to scheduling of construction and special construction techniques. On occasion, mitigative measures are also applied to the operation of compressor stations.

The following sections summarize environmental concerns identified at proposed compressor station, camp and stockpile sites, and outline mitigative measures deemed to be necessary. Refinement of the suggested measures, if any, will be a component of the process involved in the preparation of various "protection plans" which will be submitted to the NPA in support of final design documents and construction plans.

4.1 COMPRESSOR STATION SITES

Presently-planned compressor station locations have been outlined in Section 3.1 of this report, and are illustrated on 1:50,000 scale maps which accompany Submission 2-1 (Project Description). Table 6-1.2 shows the presence or absence of environmental concerns at specific station sites. Concerns are presented and discussed under the headings fish, mammals and birds.

The size of compressor station construction camps will be approximately 16 ha (400 m x 400 m), while the station itself will be 6.6 ha (300 m x 220 m) in size. Schedules for construction of compressor stations vary, and are presented in the following discussion. Following construction, compressor stations will be operative throughout the year.

Fish

No fisheries concerns have been identified at any of the proposed compressor station locations.

Mammals

<u>STA-311 (KP 64.7)</u> The existence of productive muskrat habitat has been identified within 50 m of the reserve area for Station-311, although the station itself is more than 250 m from the habitat. While site preparation during the fall of 1982 and the summers of 1983 and 1984 may result in some localized disturbance to the animals, potential habitat degradation from clearing is of greater significance. Consequently, a buffer of natural vegetation with a minimum width of 100 m

TABLE 6-1.2

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SUMMARY OF ENVIRONMENTAL CONCERNS AT COMPRESSOR STATION LOCATIONS

Location			Concern			
Compressor Station	КР	Fish	<u>Mammals</u>	Birds		
STA-311	64.7	-	Х	Х		
STA-312	146.2	-	-	-		
STA-313	214.2	-	Х	-		
STA-314	294.6	-	-	-		
STA-315	378.3	-	Х	-		
STA-321	456.0	-	-	-		
STA-322	553.9	-	-	Х		
STA-323	650.0	-	X	-		
STA-324	739.2	_	Х	-		

will be maintained between the site and the lake. In addition, no water withdrawal will be permitted from this waterbody.

STA-313 (KP 214.2) Spring and early summer bear activity has been identified as a concern at this station location. The construction schedule for STA-313 identifies activity during the fall of 1982, and the summers of 1983 and 1984. The potential for conflict with bear activity therefore exists during the early summers of 1983 and 1984, and the spring and early summers of each year during the operations phase of the Project. Potential problems primarily involve the attraction of bears to the construction camp or subsequently the operating facility. In order to avoid this attraction, strict control of waste management practices will be employed, and waste will be disposed of by incineration. Close liaison with Yukon Territorial Government (YTG) Wildlfe Branch and Parks Canada personnel will be maintained to identify any bear handling procedures that may be required.

<u>STA-315 (KP 378.3)</u> This compressor station is located in an area which has been identified as elk winter range. Since this station is scheduled for construction during the fall of 1982, and the summers of 1983 and 1984, no conflict with the timing of construction activities and winter-range use are anticipated. Although alienation of a portion of the winter range due to compressor noise can be expected, such an impact cannot be considered significant for the following reasons:

- 1. The known winter range encompasses at least 80 to 100 km^2 , bordering both sides of the Alaska Highway for approximately 15 km.
- 2. It has been estimated that, at 1 km from a typical compressor station on flat unvegetated terrain, noise levels will have decreased to 44 dBA. This conservative estimate is within the range of normal background noise levels for forested or shrub-dominated terrain during periods of wind gusts (5-15 kph) (See Submission 7-3). Assuming that animal displacement occurs up to 1 km from the compressor site, alienated range would represent less than 5 percent of the total known wintering area.
- 3. If animals are initially displaced up to 1 km from the compressor station, it is reasonable to assume that following acclimation to compressor station 'noise' the animals will not be inhibited from moving considerably closer to the station.
- <u>STA-323 (KP 650.0) AND STA-324 (KP 739.2)</u> Both of these compressor stations are located in areas identified as moose winter range. However, STA-323 is not required for initial operation and its potential impacts will not be addressed at this time.

STA-324 is scheduled for construction during the fall of 1983 and the summers of 1984 and 1985; therefore, there is no conflict with the timing of construction activities and the use of winter range by moose. Compressor noise may alienate a small portion of this range (see discussion on elk above). However, the

fire-induced seral vegetation which comprises the winter range in this area extends a linear distance exceeding 50 km along the Rancheria Valley and, consequently, range alienation will not be a significant factor.

Access to the station will be facilitated through the use of an existing road which has serviced active mining activity over the last several years on the south side of the Rancheria River. Consequently, increased hunting pressures south of the river will not arise as a result of the access road to the station.

Birds

<u>STA-311 (KP 64.7)</u> This compressor station is located on the fringe of a raptor protection zone (i.e., within 2 km of a nest). However, the nest of concern was reported in a deteriorating state in 1979 and could not be located in 1981. The last eaglet production for that raptor territory occurred in 1979, in an alternative nest more than 3 km from the compressor site. Consequently, no existing concerns for raptors are noted for the site.

<u>STA-322 (KP 553.9)</u> The concern regarding this compressor station location is the proximity of a spring staging area at the outlet of Teslin Lake. Construction is presently scheduled for the fall of 1983, and the summers of 1984 and 1985. Therefore, no conflict exists between use of the area by waterfowl in the spring and the existing construction schedule. The compressor station site is surrounded by heavy tree cover, which will minimize noise disturbance during operation of the

station and remove activities from the view of waterfowl using the area. In addition, the majority of the staging area is located more than 1 km from the compressor site.

Ice Fog Potential

In addition to the review of environmental factors at compressor station locations outlined previously, an additional evaluation regarding the potential for ice-fog formation was completed for compressor stations.

Ice fog will form from compressor station exhaust gases at low (less than -30°C) temperatures. The fate of such fog and any problems related to visibility for ground or air traffic which may arise from it depend upon the extent and rate of dispersal from the site. Temperature records applicable to each site were examined as well as topographic features near each site which could affect fog dispersal. Based on temperature and dispersal characteristics an evaluation of possible ice fog problems was completed for compressor sites. The potential for problems was found to be low or non-existent for all stations except STA-311 located at KP 64.7. At that site, topographic features made interpretation of anticipated site conditions based on available climatological records difficult. To ensure proper evaluation, a meteorological recording station has been established at that location to record on-site conditions which may then be compared with contemporary and long-term records from nearby stations to complete the evaluation.

4.2 CONSTRUCTION CAMP SITES

Concerns identified during the assessment of construction camp sites in relation to fish, wildlife, waterfowl and raptors are indicated in Table 6-1.3. In general, mainline construction camps will house between 200 and 1400 men, and occupy a space of approximately 20 ha (400 m x 500 m).

		Concern		
Location (KP)	Fish	Mammals_	Birds	
18.2	-	-	-	
75.5	-	Х	-	
146.0		-	-	
214.0	-	Х	-	
262.5	-	Х		
356.5	-	-	-	
440.0	-	-	-	
497.0	-	Х	-	
570.9	-	X	-	
616.5	-	-	-	
686.0	-	Х	-	
767.0		-	-	

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SUMMARY OF ENVIRONMENTAL CONCERNS AT CONSTRUCTION CAMP LOCATIONS

No fisheries concerns have been identified at any of the proposed construction camp sites.

Mammals

Bear concerns exist at the following construction camp locations:

<u>KP 75.5</u> This construction camp is located on the old White River floodplain, behind existing river training works. The camp is projected to house 1200 personnel, during the winter of 1984.

<u>KP 214.0</u> This construction camp is located near the Kluane Lake crossing. The camp will house approximately 1400 personnel during the winter of 1983, and 200 personnel during the summer of 1984.

<u>KP 262.5</u> This camp is proposed for an area near the Jarvis River. The camp will accommodate approximately 900 personel and is projected for use during the summer of 1983.

To avoid attraction of bears to these facilities, camp wastes will be disposed of by incineration. Project employees will be informed as to the proper behavior should an encounter occur, and feeding or attracting these animals will be prohibited. Close liaison with the YTG Wildlife Branch will be maintained concerning effective "nuisance" bear handling procedures.

<u>KP 497.0</u> This construction camp is proposed for the vicinity of Judas Creek. The camp will house approximately 900 personnel, and will be used during the

summer of 1984. Although a final camp layout has not been developed, this camp will be situated adjacent to productive, isolated beaver habitat. To avoid any potential conflicts with use of this habitat by beaver, no water withdrawal for camp use will be allowed from the beaver pond, a minimum 100 m buffer of natural vegetation will be maintained between the camp and the creek, and no storage of fuels or hazardous materials will be allowed within 300 m of Judas Creek.

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KP 570.9 This construction camp will be located on the north side of Teslin Lake. The camp will house approximately 1400 personnel, and will be used during the winter of 1984. The wildlife concern in the vicinity of this camp relates to the presence of moose winter Comprised of fire-induced seral vegetation, range. this wintering area extends for more than 8 km up Deadman Creek. Consequently, range alienation in the vicinity of the camp (which is situated at the western fringe of the range) during its period of use will not be a significant impact, and the development of major mitigative measures is not required. Project personnel will be made aware of the potential for animal-vehicle collisions in the area, and Project-controlled aircraft will maintain a 600 m above-ground altitude during the winter period except during landings and departures from the camp.

<u>KP 686.0</u> The construction camp in Section 11 is located near the Swift River. It will house approximately 800 personnel, and will be used during the winter of 1984. Wildlife concerns identified in this locale involve the presence of moose and caribou winter range. These ranges support small numbers of animals and are located primarily south of the camp. As a result, an insignificant portion of this range would be alineated by the presence of the camp and the development of major mitigative measures is not required. Project personnel will be made aware of the potential for animal-vehicle collisions in the area, and Projectcontrolled aircraft will maintain a 600 m above-ground altitude during the winter period except during landings and departures from the camp.

<u>KP 767.0</u> The construction camp for Sections 12 and 13 will accommodate approximately 1200 personnel, during the summer of 1984 and winter of 1985. This camp is situated within 1.5 km of habitat which has been identified as providing moose winter range. The distance between the construction camp and the winter range is large, and no mitigative measures will be implemented during construction and operation of the camp. However, Project-controlled aircraft will maintain a 600 m above-ground altitude in this region, except during landings and departures from the camp.

Birds

No concerns for waterfowl or raptors have been identified at proposed construction camp locations.

Compressor Station Construction Camps

Any concerns regarding compressor station construction camps were considered during the evaluation of compressor station locations, as construction camps for these facilities will be located at the same locations.

4.3 MATERIAL STORAGE AREAS

The concerns which have been identified at these locations regarding fish, mammals and birds are indicated in Table 6-1.4. These concerns, as well as proposed mitigation measures are discussed in the following:

Fish

<u>KP 108.8</u> This area will be used for pipe storage, and will be approximately 3 ha in size. The period of use for the stockpile site is the fall of 1983 and winter of 1984. The fisheries concern at this locale relates to the proximity of an important stream. In order to prevent any surface runoff from this site entering Edith Creek, dykes or berms will be constructed to retain runoff, or divert it into adjacent wooded areas. No fuels will be stored at this location.

Mammals

The following material storage sites have been identified as locations where nuisance bear problems may arise. These sites generally range in size from 2 to 4 ha.

<u>KP 75.5</u> Fuel and pipe storage. Period of use: winter 1983 to winter 1984. Concern: spring, summer and fall grizzly bear use.

<u>KP 204.5</u> Fuel and pipe storage. Period of use: winter 1982 to winter 1983. Concern: Potential nuisance bear problem from Destruction Bay landfill.

TABLE 6-1.4

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SUMMARY OF ENVIRONMENTAL CONCERNS AT STOCKPILE AND STORAGE SITE LOCATIONS

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	Storage Type	Concern		
Location	<u>Pipe</u> Fuel	<u>Fish</u>	Mamma 1s	Birds
21.5	X X	-	-	-
42.0	Х –	-	-	Х
59.3	Х –	-	-	-
75.5	ХХ	-	Х	-
94.0	Х –	-	-	-
108.8	X –	Х	-	-
142.6	– X	-	-	-
146.0	X –	· _	-	-
163.3	X –	-	Х	-
178.5	X –	-	-	Х
204.5	X X	-	X	-
219.5	X –	-	Х	-
250.4	X –	-	-	-
268.3	X –	-	Х	· –
278.2	- X	-	-	-
281.7	X –	-	-	-
294.6	X -	-	-	-
317.9	X –	-	-	-
332.2	X –	-	-	-
356.5	X –	-	-	-
373.0	X –	-	Х	-
405.0	X –	-	-	-
440.0	X –	-	-	-
467.0	X –	-	-	-
486.0	X -	-	-	-
529.0	X –	-	-	-
549.0	X X	-	-	Х
570.9	X -	-	Х	-
597.2	X –	-	-	-
612.2	X X	-	-	-
642.0	X -	-	Х	-
666.0	X -	-	-	-
686.0	X –	-	Х	-
698.0	– X	-	-	-
714.0	X X	-	-	-
746.5	X –	-	Х	Х
771.0	X X	-	-	-
797.0	X –	-	X	-
816.0	Х –	-	Х	-

<u>KP 219.5</u> Pipe storage. Period of use: winter, summer 1984. Concern: spring and early summer presence of bears.

<u>KP 268.3</u> Pipe storage. Period of use: winter, summer 1983. Concern: spring and summer grizzly bear range.

To prevent the attraction of bears to these facility locations, all combustible wastes from these facilities will be removed from the sites on a daily basis. Employees under Project control will be prohibited from feeding bears, or otherwise attracting these animals to Project facilities. In the event that a nuisance bear problem does arise, the Project will maintain close liaison with the YTG Wildlife Branch concerning efficient handling of any such situation.

> <u>KP 163.3</u> This site has been identified for pipe storage; the storage location will occupy approximately 3 ha, and will be used during the fall of 1982 and winter of 1983. The concern for this site relates to its location within a caribou migration corridor. In order to avoid the potential disturbance of these animals during migratory movements, no site preparation or stockpiling will be allowed within periods of peak movement (September 15 to November 30, April 7 to May 20).

> <u>KP 373.0</u> This pipe storage location will occupy approximately 3-4 ha, and will be used during the winter and summer of 1983. This site is located within elk winter range. Given the proximity of the site to the highway, site activities will not alienate a significantly greater portion of the range than that already affected by the highway corridors, and major protective measures are not required. However, drivers of

stockpile-related traffic will be made aware of the potential for animal-vehicle collisions in this area.

The following material storage sites are located in areas of moose or caribou winter ranges:

<u>KP 570.9</u> Pipe storage site, approximately 4-5 ha in size. Period of use: fall 1983, winter 1984. Concern: moose winter range.

<u>KP 642.0</u> Pipe storage site, approximately 4-5 ha in size. Period of use: fall 1984, winter 1985. Concern: moose winter range.

<u>KP 686.0</u> Pipe storage site, approximately 3-4 ha in size. Period of use: fall 1983, winter 1984. Concern: moose and caribou winter range.

<u>KP 746.5</u> Pipe storage site, approximately 3-4 ha in size. Period of use: winter, summer 1984. Concern: moose winter range.

<u>KP 797.0</u> Pipe storage site, approximately 2-3 ha in size. Period of use: winter, summer 1984. Concern: caribou winter range.

<u>KP 816.0</u> Pipe storage site, approximately 4 ha in size. Period of use: fall 1984, winter 1985. Concern: caribou winter range.

In all of the instances listed above, available winter-range habitat is sufficiently large that displacement of animals from the actual location of pipe or fuel stockpile sites will not be a significant impact. Stockpile-related traffic will be made aware of the potential for animal-vehicle collisions in these areas. Birds

<u>KP 42.0</u> This area has been designated as a ripe stockpile site, which will cover approximately 4 ha. The site will be used during the fall of 1984 and winter of 1985. Concern has been raised for a Sharp-tailed Grouse spring lekking area which has been identified within 1 km of the stockpile site. In order to prevent any disturbance of birds using the lekking area, the following restrictions will apply between April 1 and May 31: no clearing or site preparation; no stockpiling of pipe.

<u>KP 178.5</u> A pipe stockpile site is planned for this locale, which will occupy an area of approximately 3 ha. The site will be used during the fall of 1982, and winter of 1983. This site is situated on the fringe of a 2 km raptor protection zone. The nest in question is not in direct line of sight of the stockpile site, and activities at the site as scheduled do not impinge on the critical raptor nesting period. However, a restriction has been placed on the facility in that no blasting or clearing for site preparation will be allowed from March 20 to July 31.

<u>KP 549.0</u> This material storage site will be used for both fuel and pipe stockpiling. The site will occupy approximately 4-5 ha, and will be used from the winter of 1983 through to the summer of 1984. The waterfowl concern at this location relates to the proximity of a spring staging area in Teslin River, which is 800 m away from the material storage site. However, the stockpile site is separated from the staging area by heavy forest cover, and normal activities at this facility would not disturb staging waterfowl. Therefore, the only restriction applied to this facility is that any blasting required for site preparation will not be allowed between April 1 and May 31.

<u>KP 746.5</u> This facility location will consist of a pipe storage site, which will occupy approximately 3-4 ha, and be in use during the winter and summer of 1984. The stockpile site is located 1.5 km away from the raptor nest in question. To avoid potential conflicts with these raptors during the sensitive reproductive period, no blasting or clearing for site preparation on stockpiling will be allowed from March 20 to July 31.

4.4 RESIDUAL IMPACTS AND SUMMARY

In summary, environmental concerns are apparent at 6 out of 9 compressor station locations, 6 out of 12 construction camp locations, and 16 out of 39 stockpile and storage site locations. It is also apparent that all concerns can be met by an appropriate mitigatory response by the Project. In addition, it is important to note that the process of selecting sites involved consideration of environmental concerns and avoidance of them by relocation at an earlier stage of the planning process. Total avoidance of environmental concerns is not possible, especially when the array of other factors affecting choice of sites is considered. The Project does not consider any of the concerns identified to be of long-lasting, Many of the sites are for temporary use (i.e., permanent significance. construction camps and material storage sites) during the construction phase only. Reclamation and revegetation of all temporary sites will be undertaken after use. As a result of the processes involved in site selection, no residual impacts are anticipated at any of the facility locations identified to date.