40-8674

Three Embarcadero Center, Suite 700
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Woodward-Clyde Consultants

September 13, 1978

Division of Fuel Cycle and National Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket 40-8674
License SUA-1326

Attn: Leland C. Rouse

Dear Mr. Rouse:

By request of Plateau Resources Limited, enclosed are 10 copies of responses to NRC questions on the application for a Source Material License for the Blanding Ore-Buying Station. These questions were provided to Plateau Resources Limited by Oakridge National Laboratory informally in July, 1978.

Sincerely,

Thomas O. Baily

Thomas O. Baily
Senior Staff Scientist

Enclosure

10783

FROM: Woodward- Clyde Consultants	DATE OF DOCUMENT: Sept. 13, 1978	DATE RECEIVED: Sept. 15, 1978	NO: 10783
	LTR	MEMO	REPORT: X	OTHER
TO: L. C. Rouse	ORIG: 1	CC: 9	OTHER
	ACTION NECESSARY ☐	CONCURRENCE ☐	DATE ANSWERED
	NO ACTION NECESSARY ☐	COMMENT ☐	BY
CLASSIF: U	POST OFFICE	REG NO	FILE CODE: 40-8674

DESCRIPTION (Must Be Unclassified)

Enclosed question on the application for a Source Material License for the Blanding Ore-Buying Station

ENCLOSURES

REFERRED TO	DATE	RECEIVED BY	DAT
Reg File cy	9/18		
~~L. G. Rouse(4)~~			
J. Martin(letter only)			
~~I & E (2)~~			
PDR (1)			
		10783	
		jdh	

REMARKS

U. S. NUCLEAR REGULATORY COMMISSION — MAIL CONTROL FORM — FORM NRC-326 (1-76)

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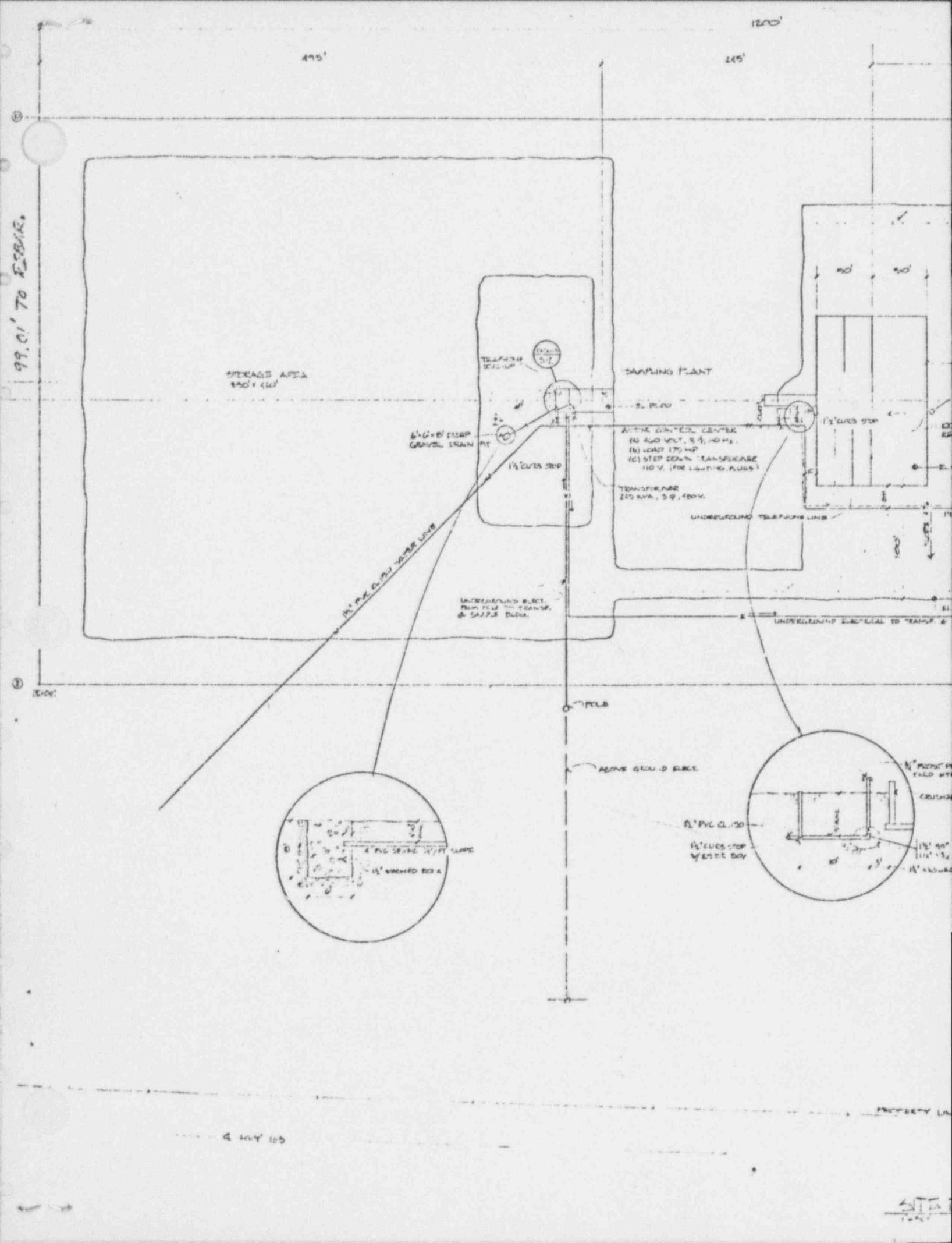
ACCESSION NUMBERS OF OVERSIZE PAGES:

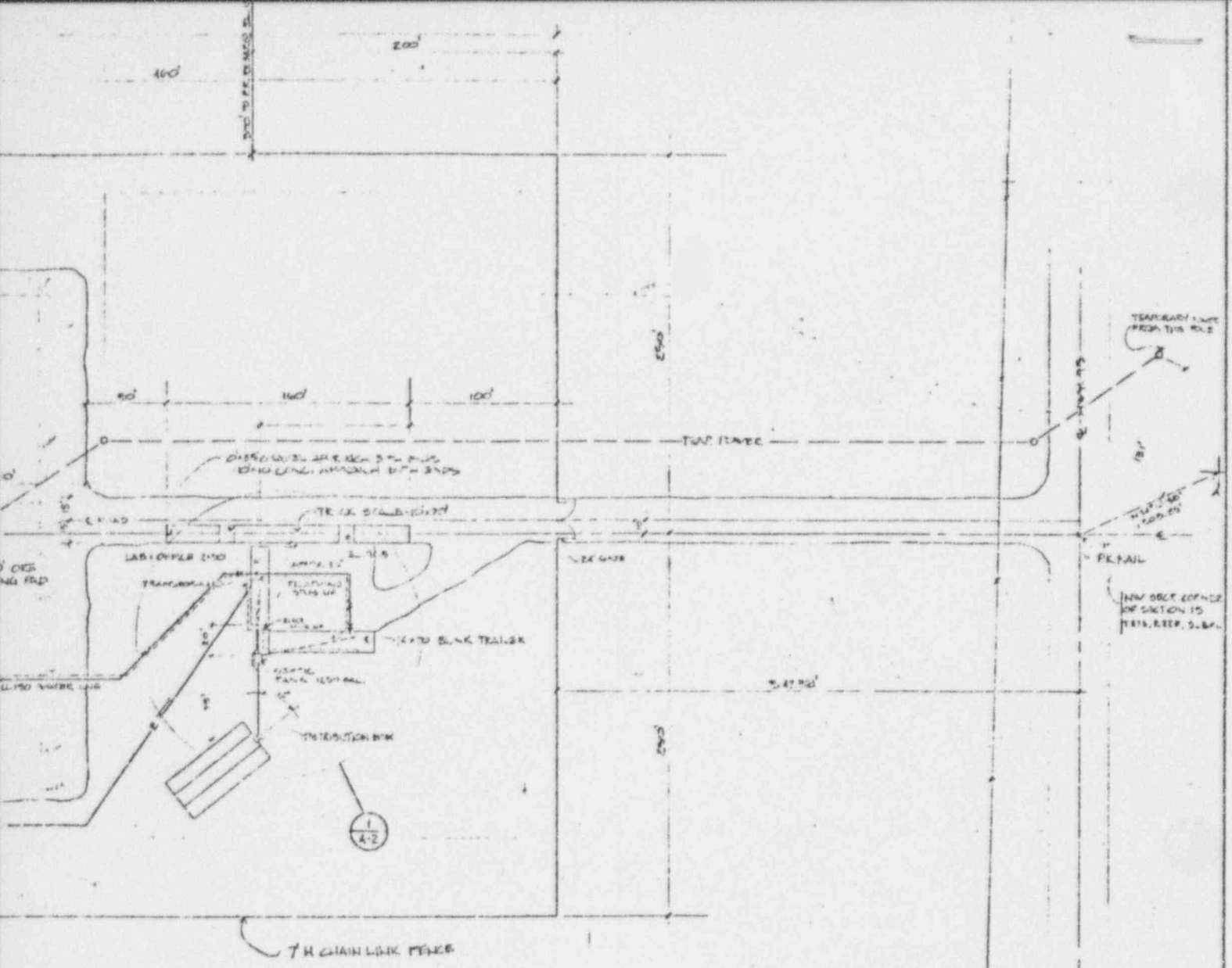
9706300097-01

Section 2.0 Site Description

Figure 2.1-3 is illegible; please clarify. Was the topsoil removed from the site prior to construction of the OBS? If so, where was the material stockpiled?

Response: A new copy of Figure 2.1-3 is attached. Topsoil was not removed from the site per se prior to construction of the OBS. Leveling of the site did require the movement of some soil. A portion of this was spread immediately to the north of the station and reseeded with grass.


1200'
495'
245'
99.01' TO ESBIR.
STORAGE AREA
SAMPLING PLANT
TELEPHONE
6'-0" x 8' DEEP
GRAVEL DRAIN PIT
1½" CURB STOP
ACTIVE CONTROL CENTER
(A) 460 VOLT, 3 Ø, 60 Hz.
(B) LOAD 175 HP
(C) STEP DOWN TRANSFORMER
110 V. (FOR LIGHTING PLUGS)
TRANSFORMER
225 KVA, 3 Ø, 480 V.
UNDERGROUND TELEPHONE LINE
UNDERGROUND ELECT.
FROM POLE TO TRANSF.
& SAMPLE BLDG.
UNDERGROUND ELECTRICAL TO TRANSF.
POLE
ABOVE GROUND ELECT.
4" PVC SEWER 1/4" PER FT SLOPE
12" MARKED BOX
4" PVC CL. 30
1½" CURB STOP
W/METER BOX
PROPERTY LINE
℄ HWY 101



9706300097-02

Section 4.3 Contaminated Equipment

Where will the contaminated, obsolete, and worn out equipment be disposed of?

Response: Operation of the OBS has shown that it will not be necessary to bury contaminated equipment. Any contaminated, obsolete, and worn out equipment can be easily decontaminated according to Annex A, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material (NRC, 1976), and then sold for scrap.

Section 5.3 Training

1. Please provide a detailed plan for "good housekeeping practices."

Response:

- Employees are required to wear standard safety equipment, including safety shoes and hardhats.

- No open fires are permitted.

- Hazard warnings are posted in appropriate locations.

- Maintenance is performed only after the supervisor responsible certifies that it can be done safely.

- Surface contamination in the laboratory and administrative offices is monitored periodically with an alpha survey meter and a geiger counter. Readings of 1000 dpm/100 cm^2 of alpha or beta-gamma contamination will trigger an immediate cleanup and an investigation to determine the source of contamination and the proper corrective action.

- Chemicals used in the laboratory for analysis of the ore are handled under a hood.

2. Please describe the available equipment and plans to assure fire protection.

Response:

- 10- and 20-lb ABC fire extinguishers are installed at all exits at the OBS.
- The 9000-gallon water storage tank used primarily for dust suppression (refer to the response to question on Section 6.2.3) can also be used for fire protection.
- The Blanding Fire Department has notified PRL that they can respond to a fire at the station in 5 minutes during the day (8 AM to 5 PM) and in 10 minutes during all other hours.

Section 6.1.2 Regional Demography and Land Use

1. In view of increase fuel consumption and environmental hazards associated with long-distance ore transport, please provide the rationale for hauling ore from the OBS to a mill 70 miles to the west when you could sell this ore to the Energy Fuels Nuclear, Inc. proposed mill 3.5 miles south of the OBS. Plateau Resources could in turn buy ore from the Energy Fuels Nuclear Hanksville OBS which is closer to its own proposed mill site.

Response: The Blanding Ore Buying Station was constructed so that PRL could establish a position in the Blanding area which would ultimately support a processing facility there. This position would be a combination of production from owned mines as well as ore purchases from independent miners and, to a large extent, was predicated on the development of substantial reserves. At this writing, PRL has not discovered reserves of a magnitude that would justify the construction of a processing facility in the Blanding area. However, PRL still has an active exploration program in the area and hopes that sufficient reserves will be found to justify a processing facility there. If that becomes the case, then ore purchased in the Blanding area would be processed at that facility.

For the present, PRL is assuming that the ore stockpiled at Blanding will be transported to the Shootering facility for processing on a supplemental feed basis that reduces slightly the mine feed requirements. Economic studies have been performed based on the assumption that PRL would not build a processing facility in the Blanding area and that all ores purchased in that area would be processed at Shootering. While the cost of transporting the ores stockpiled

at the OBS to Shootering are substantial (approaching $10/ton), both the economic return and yellowcake production objectives of PRL are met by such a plan. This plan assumes that, if there is not substantial additional exploration success in the Blanding area, the OBS would be shutdown by the end of 1980. That being the case, ores purchased in the Blanding area after the shutdown of the station would be shipped directly to Shootering.

2. In terms of animal unit months (AUM) please discuss the grazing capacity of the lands in the vicinity of the station.

Response. In the pinyon-juniper type, the land can support approximately 0.02 AUM/acre. In the sagebrush/grass type, the land can support 0.05 AUM/acre (Mr. N. Sandberg, BLM, Monticello Office).

3. Please provide a map of the approximate scale 1" = 500' clearly indicating and delineating present land use with 1-mile radius from the center of the site (including grazing, cropland, residential, recreation, non-use). What is the grazing capacity on those lands that are grazed? Also, delineate the applicant's property boundary (encompassing 63 acres) on this map.

Response: The requested map is attached. Information on the map has been obtained from air photos, the San Juan County map, U.S.G.S. topographic maps, and field checks. The land used for grazing is capable of supporting 0.02 to 0.05 AUM/acre (refer to response 2 above).

Section 6.1.3 Ecology

1. The sagebrush/grass community in Table 6.1-8 does not list *Artemesia tridentata*. Please correct.

Response: A corrected version of this table is attached.

Table 6.1-8. REPRESENTATIVE TREES, SHRUBS, GRASSES, AND FORBS IN THE OBS REGION

Scientific Name	Common Name
SAGEBRUSH/GRASS VEGETATION	
SHRUBS	
Amelanchier utahensis	Utah serviceberry
Atriplex canescens	Four-wing saltbush
Chrysothamnus nauseosus	Rabbitbrush
Chrysothamnus depressus	Rabbitbrush
Cowania mexicana	Cliff rose
Ephedra torreyana	Mormon tea
Eurotia lanata	Winterfat
Grayia spinosa	Spiny hopsage
Gutierrezia sarothrae	Snakeweed
Lycium pallidum	Rabbitthorn
Prunus virginiana	Chokecherry
Rhus trilobata	Squawbush
Ribes aureum	Gooseberry
Sarcobatus vermiculatus	Greasewood
Tamarix pentandra	Tamarisk
Yucca angustissima	Yucca
Artemisia tridentata	Big sagebrush
GRASSES	
Agropyron spicatum	Bluebunch wheatgrass
Aristida fendleriana	Fender three-awn
Aristida longiseta	Red three-awn
Bouteloua gracilis	Blue gramma
Hilaria jamesii	Galleta
Orryzopsis hymenoides	Indian ricegrass
Phragmites communis	Common reed
Sitanion hystrix	Squirreltail
Sporobolus airoides	Alkali sacaton
Stipa comata	Needle-and-thread
HERBACEOUS PERENNIALS	
Apocynum cannabinum	Dogbane
Arabis pulchra	Prince's rock cress
Asclepias capricornu	Milkweed
Asclepias subverticillata	Milkweed
Astragalus utahensis	Utah milkvetch
Brickellia californica	California brickellbush
Calochortus nutallii	Nutall's sego lily
Carex sp.	Sedges
Castilleja chromosa	Indian paintbrush
Cryptantha bakerii	Baker's forget-me-not

Table 6.1-8. (continued)

Scientific Name	Common Name
HERBACEOUS PERENNIALS (continued)	
Delphinium nelsonii	Nelson delphinium
Eriogonum sp.	Buckwheat
Haplopappus armerioides	Goldenbush
Hymenoxys acaulis	Goldflower
Juncus sp.	Rush
Lomatium grayi	Desert parsley
Mirabilis multiflora	Four o'clock
Opuntia sp.	Cactus
Penstemon angustifolius caudatus	Beardtongue
Rumex hymenosepalus	Dock
Senecio longilobatus	Groundsel
Senecio multilobatus	Groundsel
Stanleya pinnata	Prince's plume
Townsendia incana	Hook
Typha latifolia	Cattail
Amaranthus ssp.	Amaranth
Aster arenosus	Aster
Bromus tectorum	Cheatgrass
Chenopodium glaucum	Goosefoot
Cirsium neomexicanum	Thistle
Eriogonum sp.	Buckwheat
Erodium cicutarium	Heronsbill
Euphorbia fendleri	Spurge
Halogeton glomeratus	Halogeton
Helianthus annuus	Sunflower
Lactuca scariola	Prickly lettuce
Lepidium sp.	Peppergrass
Plantago purshii	Plantain
PINYON-JUNIPER VEGETATION	
TREES	
Juniperus osteosperma	Utah juniper
Pinus edulis	Pinyon pine
Populus fremontii	Fremont cottonwood
SHRUBS	
Amelanchier utahensis	Utah serviceberry
Artemisia tridentata	Big sagebrush
Atriplex canescens	Four-wing saltbush
Atriplex confortifolia	Shadescale
Cercocarpus montanus	Mountain mahogany
Chrysothamnus nauseosus	Rabbitbrush

Table 6.1-8. (continued)

Scientific Name	Common Name
SHRUBS (continued)	
Quercus gambelii	Gambel's oak
Quercus turbinella	Shrub live-oak
Ribes aureum	Gooseberry
Chrysothamnus depressus	Rabbitbrush
Cowania mexicana	Cowania
Ephedra torreyana	Mormon tea
Gutierrezia sarothrae	Snakeweed
Purshia tridentata	Bitterbrush
Rhus trilobata	Squawbush
Tetradymia canescens	Horsebrush
GRASSES	
Agropyron spicatum	Bluebunch wheatgrass
Aristida longiseta	Red three-awn
Bouteloua gracilis	Blue gramma
Oryzopsis hymenoides	Indian ricegrass
Poa fendleriana	Mutton bluegrass
Sitanion hystrix	Squirreltail
Sporobolus airoides	Alkali sacaton
Stipa comata	Needle-and-thread
HERBACEOUS PERENNIALS	
Astragalus sp.	Milkvetch
Castilleja sp.	Indian paintbrush
Eriogonum sp.	Buckwheat
Hymenoxys acaulis	Hymenoxys
Opuntia sp.	Cactus
Penstemon sp.	Beardtongue
HERBACEOUS ANNUALS	
Erodium cicutarium	Heronsbill
Helianthus annuus	Sunflower
Lepidium sp.	Peppergrass
Plantago purshii	Plantain
Polygonum sp.	Knotweed
Amaranthus sp.	Amaranth
Bromus tectorum	Cheatgrass
Chenopodium album	Lambsquarters
Convolvulus arvensis	Bindweed
Cordylanthus wrightii	Birdbeak
Descurainia sp.	Tansy mustard
Draba reptans	Whitlowgrass
Eriogonum sp.	Buckwheat

Table 6.1-8. (concluded)

Scientific Name	Common Name
OLD FIELD VEGETATION	
TREES	
Juniperus osteosperma	Utah juniper
SHRUBS	
Artemisia tridentata	Big sagebrush
Chrysothamus sp.	Rabbitbrush
GRASSES	
Bromus sp.	Brome grasses
Oryzopsis hymenoides	Indian ricegrass
Hordeum jubatum	Foxtail barley
Hilaria jamesii	Galleta
Sporobolus airoides	Alkali sacaton
HERBACEOUS PERENNIALS	
Halogeton glomeratus	Halogeton
HERBACEOUS ANNUALS	
Salsola kali	Russian thistle
Erodium sp.	Storkbill
Chenopodium album	Common lambsquarters

2. The applicant states that the sagebrush/grass community is an important winter range for deer. Please estimate the density of deer in the vicinity of the project site for each season.

Response: Based on conversations with Mr. Rodney Yohn (Big Game Supervisor, Utah State Division of Wildlife Resources), Mr. Derris Jones (Game Warden, Utah State Division of Wildlife Resources), and Mr. Jim Bates (Herd Unit Manager, Utah State Division of Wildlife Resources), approximately 200 to 400 deer inhabit a 15-square mile area around the OBS during the winter (November through April). These deer probably concentrate in Westwater Creek Canyon. Small concentrations may also be found to the south on White Mesa. In the spring, the deer move north to higher country where food and water are more plentiful; returning to the general OBS area in the fall.

3. On page 6-27 it is stated that the striped skunk is expected to be abundant near the OBS, whereas in Table 6.1-9 the striped skunk is listed as rare in agricultural habitat. Please clarify.

Response: An error was made in Table 6.1-9. The striped skunk is expected to be relatively abundant near the OBS.

4. Please provide data on suspended particulate and SO_2 concentrations at the Bullfrog Basin Marina.

Response: Suspended particulate data for Bullfrog Basin Marina are summarized in the attached table. The State of Utah has measured SO_2 concentrations at the marina since June 1975 using a continuous monitor. To date, measured SO_2 concentrations are reported to have been below the limit of detection (0.005 ppm) most of the time, with infrequent concentrations as high as 0.01 to 0.02 ppm. Data summaries are available from the Utah Department of Social Services, Division of Public Health, Bureau of Air Quality, Salt Lake City.

SUSPENDED PARTICULATE MATTER CONCENTRATIONS AT BULLFROG BASIN MARINA

Year	Annual Geometric Mean ($\mu g/m^3$)	24-hour Concentrations ($\mu g/m^3$)	
		Highest	Second Highest
1971	11	529[a]	112[a]
1972	21	600[a]	244[a]
1973[b]	-	-	-
1974[b]	-	-	-
1975[c]	14	183	151
1976	15	120	115
1977[d]	20	258	176

[a]Before June 1975, the high-volume air sampler was positioned near ground level (about 3 feet above the ground). In June 1975 the sampler was moved to a position about 10-12 feet above the ground, as is recommended by the U.S. Environmental Protection Agency. Although indicative of normally higher maximum concentrations nearer ground level, 24-hour maximum concentrations reported for 1971 and 1972 are not directly comparable to federal air quality standards.

[b]Data collection during 1973 and 1974 was inadequate to allow summary.

[c]Data for 1975 are based on the period from July through December.

[d]Data for 1977 are based on the period from January through September.

5. The section on endangered or threatened vascular plants and wildlife should reference the most recent Federal Register on this subject.

Response: The most recent reference for endangered and threatened plants and wildlife is: U.S. Fish and Wildlife Service. 1977. International Trade in Endangered Species of Wild Fauna and Flora, Implementation of Convention, Federal Register 42(35): 10462-10488.

Section 6.2.3 Sources of OBS Wastes and Effluents

Page 6-64 states that dust emissions from the ore stockpiles will be controlled by water sprinkling or other dust control methods. Please state the conditions under which water sprinkling will be applied to the ore piles. Please describe the "other dust control methods" and the conditions under which these methods will be used.

Response: Water used for dust suppression is obtained from Well No. 1 at the OBS. This water is stored in a 9000 gallon tank and sprayed on the ore when necessary through a series of irrigation-type sprinklers. The ore is wetted down under the following circumstances:

- when new ore is placed on the stockpiles
- whenever vehicles travel on the stockpiles
- whenever it is windy

It has been observed that a crust forms on the ore after it has been sprinkled with water. This crust combined with compaction of the ore as a result of vehicle travel across the piles has stabilized the stockpiles. Consequently, the use of other dust control methods is not necessary.

Section 6.2.7 Reclamation and Restoration

1. The applicant states that 4 to 6 inches of topsoil will be placed over all areas where the soil was removed during construction of the OBS or stripped because of subsequent radioactive contamination. Where will the topsoil be obtained?

Response: the excess topsoil removed from the OBS site during leveling that was spread to the north of the station will be used first for reclamation (refer to the response to question on Section 2.0). If additional material is required, four inches of topsoil will be scrapped from undisturbed areas, as required. It is estimated that eight inches of topsoil covers the station property.

2. In view of the fact that Utah's Division of Oil, Gas, and Mines feels that a reseeding program should include a wide diversity of species, discuss the feasibility of including seeds of native forbs and shrubs in your reclamation plans.

Response: It is understood that the use of both native grasses, forbs, and shrubs in reclamation is desirable. When the area to be reclaimed is large, such as in a surface mining project, it is important to include species other than grasses in the seeding mixture since natural dispersion of seeds from undisturbed areas may be minor or spotty. However, on an area as small as the ore buying station, the reestablishment of native shrubs and forbs is not only possible, but difficult to prevent. The proposed reclamation plan is designed to provide a plant cover of native species in the shortest possible time period. Such a program will assist in preventing wind and water erosion. It is likely that the dispersion of seeds from surrounding areas will result in the establishment of native shrubs and forbs within a few years after project termination.

From a practical standpoint, only native shrub species could be included in the proposed seed mixture. Seeds from such species as big sagebrush and four-wing saltbush can be obtained from several vendors in Utah. We are not aware of any vendors that can provide sufficient seed of native forbs for use in reclamation.

3. Discuss the financial arrangements to insure that adequate funds will be available for site reclamation and restoration when operations are concluded.

Response: The Utah Board of Oil, Gas, and Mining determines the amount and form of surety required after they have approved the proposed mining operation. Consequently, financial arrangements to insure funding for reclamation have not yet been made.

Section 6.4.1 Radiological Impact on Biota Other Than Man

The applicant states that a small pond located near the southeast corner of the OBS property has been fenced to prevent access. Who has ownership of this pond - applicant, private, or public? On page 6-121 the applicant states that this pond was fenced to preclude use by cattle. What is the size of the fenced area? What species of wildlife utilize this pond? If significant levels of toxic materials and radiological materials accumulate in this pond, what plan is proposed to discourage its use by wildlife?

Response: The pond located near the southeast corner of the OBS property is owned by PRL. It is fenced with four strands of barbed wire placed in a rectangle approximately 100 yards long by 100 feet wide.

Wildlife most commonly using this pond include song birds, weasel, skunk, rabbits, coyote, fox, small mammals, amphibians common to the region, and occasionally waterfowl such as the mallard and shorebirds such as the killdeer and plover.

In the event that toxic and/or radiological materials accumulate in the pond to hazardous levels, it will be filled in.

Section 6.4.3. Effects of Sanitary and Other Waste Discharge

1. With reference to dispersion modeling, please provide the rationale for using meteorological data from Farmington, New Mexico (located approximately 100 miles southeast of the OBS) and not from Blanding (located 2.5 miles north of the OBS) or the Energy Fuels Nuclear proposed mill site (located 3.5 miles south of the OBS). Using meteorological data from Blanding or Energy Fuels Nuclear, Inc., what would be the maximum annual average concentration of suspended particulates both on and off the applicant's property during station operation? Include the distance and direction from the station and all meteorological assumptions.

Response: As indicated in Section 2.2 of the license application (pages 2-7 through 2-9), Blanding meteorological summaries were not available in a form that is necessary for atmospheric dispersion modeling. Recent communications with the National Climatic Center confirmed that such summaries are still not available and will not be until December of 1978, even if ordered immediately.

Meteorological data provided in the environmental report on Energy Fuels' proposed mill do not contain sufficient information to develop a model.

Section 2.2 of the license application indicates that comparisons of concurrent Blanding and Farmington data showed reasonably good correlations, with somewhat higher wind speeds at Farmington and about a two sector clockwise shift in wind direction at Blanding. Farmington data were modified to approximate Blanding conditions for dispersion modeling. These modifications are described in detail in Section 2.2.

Since the major emitters of particulate matter from the project area are ground-level fugitive dust sources, maximum onsite concentrations will occur at these sources and maximum offsite concentrations will occur along the property boundary. Dispersion modeling discussed in Section 6.4.3 indicates that the maximum annual average concentrations will occur to the south.

2. On page 6-89 the applicant states that "annual average concentrations of suspended particulates will be temporarily elevated in the immediate vicinity of the OBS, but contributions from the station are predicted to drop to insignificant levels within relatively short distances from the OBS property boundary." Please clarify this statement; indicate what is meant by "temporarily elevated", "immediate vicinity", "insignificant", and "relatively short distances."

Response: Air quality impacts resulting from the proposed project are considered to be temporary since emissions will return to background after decommissioning of the facility.

Modeling indicates that project emissions will increase annual-average suspended particulate concentrations by about 27 $\mu g/m^3$ (above background) along the southern property boundary. This increase in annual-average concentration is expected to decrease to less than 5 $\mu g/m^3$ within 1 kilometer from the property boundary and below 1 $\mu g/m^3$ within 2 kilometers of the boundary in the same direction. For further details, see Section 6.2.3 of the license application for estimated emissions and Appendix B for atmospheric dispersion coefficients. Actual concentrations should be lower than estimated due to the conservatism of the model used.

Based on the precision and accuracy of current monitoring and modeling methods for suspended particulate matter, concentration increments of 1 to 5 $\mu g/m^3$ can be considered quite low. The annual average suspended particulate increment established by the EPA for prevention of significant deterioration of air quality is much higher

(19 $\mu g/m^3$) in a Class II attainment area and presently does not apply to fugitive dust emissions.

Section 6.9 References

Please provide a copy of the following references:

Olsen, P.F. 1973. Wildlife Resources of the Utah Oil Shale Area. Utah Department of Natural Resources, Division of Wildlife Resources. Publications No. 74-2.

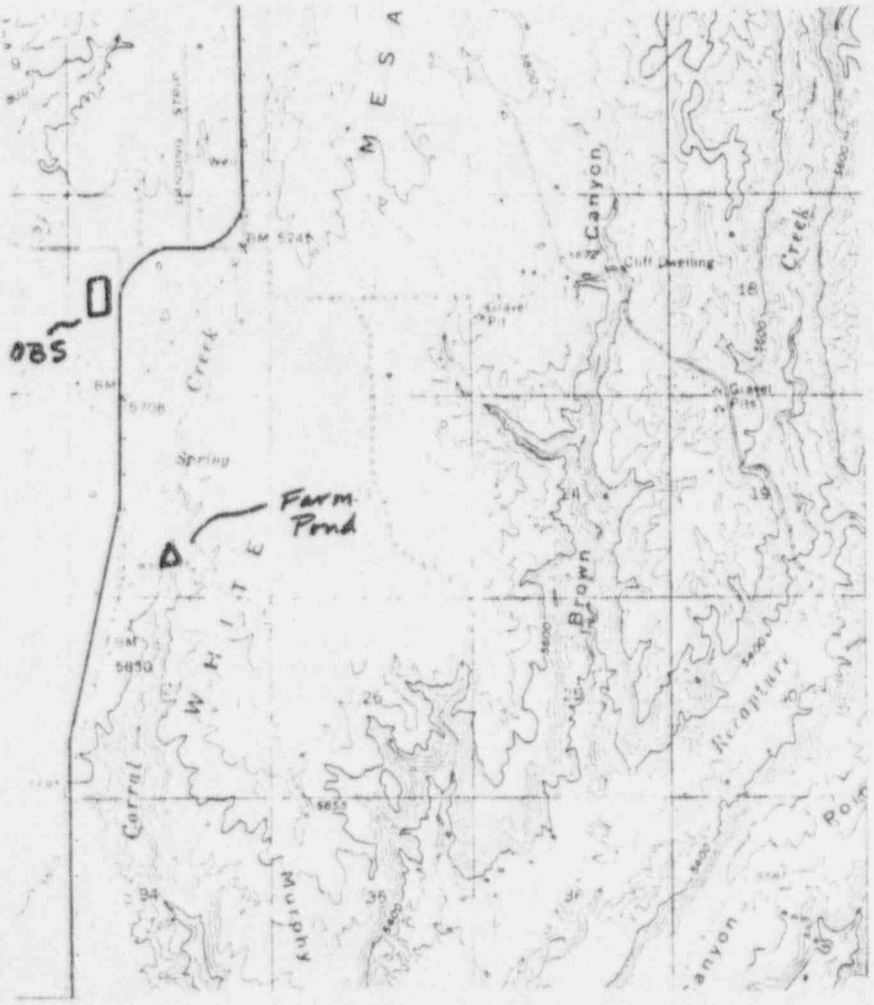
Wilson, L., M.E. Olsen, T.B. Hutchings, A.R. Southard, and A.J. Erickson. 1975. Soils of Utah. Utah Agricultural Experiment Station. Bulletin 492.

Response: The requested references are attached.

2.3.1 Surface Water Hydrology

1. Indicate on a map the location and size of the small runoff and spring-fed farm pond formed behind the small dam across Corral Creek approximately 1 mile southeast of the OBS across state road 163.

Response: As shown on the map below, the farm pond is located approximately 1.25 miles south of the OBS. This pond is shaped like an equilateral triangle with a base of 200 feet at the dam and sides roughly 250 feet long. The pond is seven feet deep at its deepest point next to the dam embankment.



2. List the users and uses of the water in the above mentioned farm pond in Corral Creek.

Response: This pond is owned by the two individuals on whose property it resides, Marva Laws and J. Glenn Shumway. It is used for stock watering and irrigation. Based on field observations, it appears that the pond occasionally dries up due to a lack of runoff and locally high evaporation rates.

3. If stream flow records are not available qualitatively define the water flow in Corral Creek. During what season and/or precipitation conditions will Corral Creek carry water? What is the approximate duration of fill at these times?

Response: While flows in Corral Creek are not currently gaged, two regional streams, Cottonwood and Recapture creeks, do have existing flow records. By using these records for the last 10 years in conjunction with meteorological data for Blanding, it is possible to make an estimate of the flow patterns to be expected in Corral Creek.

The flow record for Cottonwood Creek, which is closest in elevation to Corral Creek, indicates that there are significant flows only during the spring snowmelt and fall thunderstorm periods. A review of precipitation and temperature records for Blanding indicates that a similar pattern would also exist for Corral Creek.

The actual amount of runoff that might be expected in Corral Creek during these high periods of flow is expected to be low due to the small size of the creek's drainage area. Even if the Cottonwood Creek monthly yields are assumed to be directly transferable to Corral Creek, the average monthly flow rates for Corral Creek during the highest period of runoff (April) would probably not exceed 0.7 cfs. Consequently, it is anticipated that flows only occur in Corral Creek during and after rainstorms, during snowmelt conditions, and in those limited reaches where seepage from nearby springs or irrigation channels enters the creek.

4. Provide a reference for the water quality data presented for station 11 in the San Juan River at the Colorado-New Mexico Border.

Response: STORET data from the EPA, Air and Water Surveillance and Analysis Division, Denver, Colorado (1968-1975). Station No. 11, Section 21, T32N, R20W on the San Juan River.

6.1.3 Ecology

1. Describe the aquatic biota present in the farm pond approximately 1 mile south-east of the OBS in Corral Creek. Indicate if there are any fish populations present, and if so, of what species.

Response: While field observations have not been made, it is expected that the pond supports the following plants and animals

Vegetation	
Broad leaf cattail	*Typha latifolia*
Seepweed	*Suaeda* sp.
Bullrush	*Scirpus* sp.
Saltgrass	*Distichlis stricta*
Pickleweed	*Allenrolfea occidentalis*
Salt cedar	*Tamarix pentandra*
Greasewood	*Sarcobatus vermiculatus*
Cottonwood	*Populus balsamifera*
Amphibians	
Tiger salamander	*Ambystoma tigrinum*
Leopard frog	*Rana pipiens*

Since this pond is intermittent, it is not expected to support any fish species.

2. Indicate the closest aquatic environments in the position to receive runoff from the OBS (either directly or through Corral Creek) that could possibly support an aquatic species designated as endangered or threatened by the federal or state government.

Response: The San Juan River, located approximately 20 miles south of the OBS, is the closest aquatic environment to the station that could support threatened or endangered species. The following threatened or endangered species are found in this river:

Colorado squawfish	Ptychocheilus lucius
Humpback chub	Gila cypha
Humpback sucker	Xyrauchen texanus
Bonytail	Gila robusta elegans

6.2 The Ore-Buying Station

1. Discuss the desirability and feasibility of constructing a low containment wall (approximately 2' high) downgradient from the OBS ore stockpiles to contain runoff.

Response: While a containment wall is feasible, it is not necessary. As detailed in the response to question 2 on section 6.4, a 2.5- to 3-foot rise already separates the catchment area for the ore stockpiles from the ditch paralleling Highway 163. Even under heavy rainfall conditions (e.g., PMP), runoff from the stockpile area would be impounded in the basin formed by this rise and would not enter the ditch and ultimately Corral Creek.

2. What is the anticipated chemical composition of the ore to be processed and stockpiled at the OBS? Include trace and heavy metal composition.

Response: At present, the chemical composition of the ore is not known. Composite samples of the ore have been sent to Eberline Laboratories for analysis of the following constituents.

Silica	Iron
Calcium	Nickel
Potassium	Copper
Magnesium	Zinc
Uranium	Selenium
Vanadium	Molybdenum
Chromium	Silver
Manganese	Mercury
Boron	Tin
Carbon	Barium
Potassium	Lead
Sulfate	Radium
Carbonate	Cerium
Thorium	Leachable/Exchangable
Gamma Spectroscopy	Alpha Spectroscopy

The results of the analyses will be forwarded to the NRC as soon as they are available.

6.4 Environmental Effects

1. What is the predicted chemical composition of rainfall runoff from the ore stockpiles? Include quantitative analysis of the material transported as particulates and material transported in solution.

Response: No leaching studies have been conducted on the ore; however, it is reasonable to assume that under worst-case conditions runoff from the ore stockpiles would have the same chemical composition as groundwater from the Salt Wash Formation, the primary ore producing zone. Data from OBS Well No. 2 (Table 6.1-14 in the Source Material License application) represent the quality of water from this formation. Because this well water can be assumed to be in equilibrium with the rock of the formation, its quality should represent the maximum concentrations that might be found in stockpile leachate.

2. Estimate the extent of runoff transport of ore material down-gradient of the OBS during usual and PMP (Probable Maximum Precipation) conditions. What is the probability of ore stockpile runoff running under state road 163 through a culvert and entering Corral Creek.

Response: It is not anticipated that runoff from the ore stockpile area will reach Corral Creek under either normal or PMP conditions. A more detailed inspection of the OBS area indicates that the catchment area that includes the ore stockpiles only covers about 12.5 acres; approximately 1/3 of which consists of an enclosed basin down-gradient from the stockpiles. This basin is separated from the highway ditch by a rise of 2.5 to 3 feet. Consequently, even under heavy rainfall conditions that might result in runoff, the water would impound in this basin rather than run into Corral Creek via the culverts under Highway 163. In addition, a bar ditch approximately 30 feet wide and 2.5 feet deep with a storage capacity of 1 to 2 acre-feet located on the west side of the highway acts as a secondary barrier to runoff flowing toward Corral Creek. Percolation and evaporation from these two restraining basins is believed adequate to account for all runoff from the stockpiles. Consequently, the probability of ore stockpile runoff being carried directly into Corral Creek is quite low.

6.5 Effluents and Environmental Measures

1. Mercury levels at all surface water sample sites are above the EPA recommended limit of .05 µg/l for the protection of fresh water aquatic life. Discuss the source of this mercury.

Response: The levels of mercury reported in the surface waters may be above the EPA recommended limit of 0.05 µg/l for the protection of fresh water aquatic life, but mercury levels are commonly higher than that recommended level throughout much of the west. The primary source would appear to be the volcanics and intrusives that characterize large sections of the Colorado Plateau as well as the Basin and Range Physiographic Province and the West Coast. A secondary source appears to be various formations containing coal members or carbonaceous sandstones and shale, particularly those dating since the onset of the Cretaceous.

In addition, it is not uncommon to find detectable, if not economically exploitable, mercury levels in sediments associated with other minerals such as uranium. The association may be only coincidental, such as mercury being a componenet of the sulfides that provide reduction zones for oxidized uranium solutions, or it may be correlative, with the mercury and uranium being separate constituents of a volcanic implacement or leachate from volcanic ash.

Whatever the case, the water samples were taken in an acknowledged mineralized area (uranium and vanadium), including areas which have been mined in the last few decades and where the mine spoils were

left exposed. Some of the samples were taken in the Brushy Basin Member of the Morrison Formation, which is a volcanic ash deposit.

The fact that the mercury content of the water in Lake Powell is of the same order of magnitude as the samples taken a few miles west of the OBS suggests strongly that such concentrations must be common to the upper Colorado river drainage. Similar values, and values that are often higher, characterize many of the waterr draining the Wyoming and New Mexico portions of the Colorado Plateau.

2. It is stated in the ER that water quality measurements will be periodically taken. Indicate where the surface water quality measurements are to be taken, by whom, what parameters will be measured, and with what frequency.

Response: Surface water quality measurements must be taken on the basis of runoff availability. As noted on page 6-122 of the Source Material License application, major runoff events will be sampled each year (not to exceed one per month). In all likelihood this will include at least spring and fall samples, with possible additional sampling in summer and winter, depending an occurrence of significant thunderstorm activity or snowmelt, respectively. Samples may be taken, if available, in the fenced impoundment (page 6-121), the topographic basin below the ore stockpiles, and the ditch on the west side of Highway 163 (page 6-122). Plans for water quality sampling formulated during the interim license period will extend the surface water sampling locations to the "perennial" reach of Westwater Creek, to Corral Creek above the confluence of the catchment that includes the OBS, and to the Corral Creek impoundment in the SW1/4 of Section 22, T37S, R22E.

Samples will be taken by or under the supervision of Mr. Jay Davis of Plateau Resources Limited. The samples will be analyzed for major water quality constituents, total uranium, and radium. In general, the major parameters will include specific conductance, temperature, pH, bicarbonate, sulfate, chloride, sodium, potassium, calcium, and magnesium. After several analyses, if it appears that

some of the component measurements are remaining relatively constant, or show a direct relation to some other measured constituent, then the number of constituents analyzed may be reduced upon concurrence from the state of Utah and the NRC.

3. In as much as Corral Creek and the farm pond are downgradient and could receive ore stockpile runoff from the OBS, give rationale for not monitoring the sediments and water in these areas during station operation.

Response: It is doubtful that significant runoff originating on or intercepted by the OBS will reach Corral Creek or the farm pond. High infiltration rates and low topographic slopes, as well as natural and existing manmade barriers between the OBS and the nearest definable tributary of Corral Creek, essentially preclude OBS-related runoff from reaching the creek. Even under extraordinary conditions of runoff (Antecedent Condition III (SCS)), water from the general catchment in which of OBS lies will impound west of Highway 163. Within this temporary impoundment there will be accelerated infiltration, sedimentation, and marked dilution of any OBS-related runoff. It should be borne in mind that the general subbasin that includes the OBS is relatively insignificant compared to the upstream catchment of Corral Creek. Rather than monitoring the creek, it seemed more logical to evaluate water that may accumulate in the natural basin and ditch bordering the west side of Highway 163.

4. Give rationale for sampling waters in the Cheese and Raisin area approximately 7 miles to the WNW of the OBS and not in the perennial stretch of Westwater Creek within 1.5 miles of the farm pond downgradient from the O.B.S.

Response: The rationale for sampling surface waters in the Cheese and Raisins area was based on the need to supply available data that might be germane to the OBS project in the limited time provided. Although taken for a different purpose, the sampling predated the decision by the NRC that ore buying stations had to be licensed. Prior to that decision, environmental water quality surveillance was not a prerequisite for operation of an ore buying station. Current plans being formulated by Plateau Resources Limited under the interim operating license include sampling locations on both Westwater Creek and the reach of Corral Creek on which the farm pond is located, as well as the springs mentioned on page 6-121 of the Source Material License application.