CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

U. S. Steel Mining Company, Inc.
Wellington Preparation Plant
ACT/007/012, Carbon County

August 22, 1984

The Division of Oil, Gas and Mining (DOGM) has determined that operations at U. S. Steel's coal preparation plant at Wellington, Utah, will not significantly impact the local or regional hydrologic system. Based on procedures and plans outlined in U. S. Steel's Permit Application Package (PAP) (summarized in the Technical Analysis [TA]), DOGM finds that U. S. Steel will utilize the best technology available to comply with Utah Coal Mining Regulations to minimize diminution to the hydrologic regime on the disturbed and adjacent areas of the facilities. The following information portrays the worst case scenario of the negative impacts which could potentially affect the hydrologic regime, and the mitigative measures which will be used to minimize the potential impacts and/or justification as to why the significant impacts are not expected to occur.

The main activity at the Wellington Preparation Plant consists of processing run-of-the-mill coal which is presently transported via train from U. S. Steel's Somerset Mine in Colorado. Run-of-the-mill coal was also shipped from U. S. Steel's Geneva Coal Mine in Carbon County, Utah, until the mine closed in January of 1984. The preparation facilities (see Map E9-3341) consist of a coal cleaning plant where waste materials are extracted, a heat dryer to extract moisture from the cleaned coal, sheds, shops and other buildings, water transport and storage facilities, runoff control structures, ponds (refuse, auxiliary, sedimentation, heat dryer and clear water), settling basins and impoundments, refuse piles, roads and a railroad system for transporting coal to and from the facilities.

No mining takes place on or adjacent to the proposed permit area, therefore, certain regulations governing coal extraction do not apply. All information required in part UMC 827 of the Utah Coal Mining Regulations (Special Permanent Program Performance Standards - Coal Processing Plants and Support Facilities Not Located At or Near the Minesite or Not Within the Permit Area for a Mine) has been supplied by U. S. Steel and approved with stipulations by DOGM.

GEOLOGY

The coal cleaning plant is located on the Price River flood plain. The exposed rock sequence in the Castle Valley area consists of members of the Mancos Shale and coverings of Quaternary sediments which form terraces and alluvial deposits.

Quaternary alluvial deposits directly overlie the Bluegate Shale member. Alluvial deposits are generally found within 200 to 500 feet of the Price River and measure 15 to 42 feet within the proposed permit area. The alluvium consists of consolidated to unconsolidated clay, silt, sand and gravels derived from disintegrated shale and sandstone beds with small rounded sandstone cobbles scattered throughout.

The plant facilities and refuse ponds are constructed on what Watkind (1979) terms Slope Wash (QSW, Holocene and Pleistocene). It consists of unconsolidated clays and silts derived from disintegrated Mancos Shale. The thickness ranges from a thin veneer to approximately 50 feet deep in some areas near the plant site.

The Mancos Shale is of marine origin deposited during Upper Cretaceous age. It (the Mancos Shale) is subdivided into five members from bottom to top as follows: Tununk Shale; Ferron Sandstone; Bluegate Shale; Emery Sandstone; and, Masuk Shale.

The Bluegate Shale is the most prevalent member exposed in the vicinity of the plant area. Records from boreholes and wells drilled in and adjacent to the area indicate that the Bluegate Shale is a continuous unit throughout the plant area with no evidence of folds, faults or joint systems present.

The Bluegate and Tununk Shales are much alike in that they are both light grey to grey, thin to medium bedded, even bedded, contain some clay concretions, disintegrate into platy angular fragments and form long barren gentle slopes.

The Ferron Sandstone member underlies the Bluegate Shale and also appears as a continuous unit throughout the plant area. It outcrops about 1.5 miles east of the plant facilities area and its dip is approximately 18° to to the north west. In this area the Ferron Sandstone consists of light brown, thin, evenly bedded, cross-bedded, very fine to fine grained sand and contains many very large rounded sandstone concretions.

Ground Water

Three units of the geologic column are of primary interest in the evaluation of the ground water in the vicinity of the coal preparation plant: the alluvial deposits, the Bluegate Shale; and, the Ferron Sandstone.

The alluvial deposits provide subsurface water for agricultural and industrial use along the Price River. Data presented in Utah Hydrologic Data Report No. 32 (C. T. Sumsion 1979) as well as other sources show the water table in the alluvial deposits near the coal

preparation plant site to be within 15 feet of the surface. The aquifer reflects a quality and yield proportionate to the water volume available in the river channel. The coal preparation plant operates an alluvial well to recharge water consumed in the coal cleaning process.

In other areas of Castle Valley, especially near the town of Emery, Utah, the Ferron Sandstone aquifer produces large quantities of good quality water. As pointed out by Lines (1983), the Ferron Sandstone in the vicinity of Wellington is represented by very fine sandstone and sandy siltstone hydrologically disconnected from the units that make up the Ferron Sandstone near Emery.

Few studies have been done on the Bluegate Shale and Ferron Sandstone members near the proposed permit area. Permeabilities were measured on samples determined to be Bluegate Shale during a geotechnical investigation conducted on the refuse ponds dikes. The permeability tests ranged from 13 feet per year to 3,700 feet per year. This range of permeabilities is considered low to moderate. It is expected that some of the permeabilities may be high because the drill holes extended only 10 feet into the shale, and the surface of the shale would likely be more weathered (more permeable) than the consolidated shale below.

Well records presented in Utah Hydrologic Data Report No. 32 (Sumsion 1979) show water sampling locations in the Bluegate Shale and Ferron Sandstone. All water samples taken in the Ferron Sandstone showed saline water present. Samples in the Bluegate Shale also showed saline water except in one well north of the plant area where fresh water was contacted at the 55 foot level. No water quality samples are available for the water contacted in the wells and for the members directly underlying the preparation plant. Two chemical analyses are reported for the Ferron Sandstone in Township 14 South, Range 9 East, Section 29 in Utah State Engineer's Technical Publication 15 (Feltis 1965). The analyses showed a dissolved solids content of 37,860 and 51,950 parts per million (ppm). Although this information does not accurately reflect the water quality in the area of the preparation plant, it does give an idea of the data available and a feel for the quality that exists in the Ferron Sandstone of Northern Castle Valley. Also significant, is the fact that the Division of Water Rights records did not reveal any users of water from the Ferron Sandstone in the permit or adjacent areas. This seems to indicate that the member is of minor local importance.

No springs exist within the proposed permit area. Only one spring is known to exist adjacent to the plant area. It issues from alluvium along the Price River two miles northeast of the facilities. Its location is upstream from the plant and no mining or construction activities in the vicinity of the spring ensure that the spring will not be impacted.

Surface Water

The area water users including the towns and cities upstream on or near the Price River are dependent on the storage of water in the Scofield Reservior and wells at a higher elevation at Colton in Price Canyon that supply water to Price, Utah. In the spring at the beginning of the irrigation season, the total flow of the Price River is diverted to an irrigation canal at the Carbon Country Club some 10 miles west of the cleaning plant. The water is drawn from the canal based on the water rights owned by users largely for agricultural uses through irrigation . The Price River at the coal cleaning plant diversions has returned to full flow due to the return of upstream, diverted irrigation water to the river through percolation during the irrigation season.

During the winter months, the flow in the river is adequate for the requirements of the coal cleaning plant.

Surface water on and adjacent to the preparation plant area consists of the Price River (perennial flow), refuse ponds, a clear water pond, several sedimentation ponds and overland flow which is generated during precipitation events.

U. S. Steel has constructed hydrologic structures to control all runoff and sediment generated during precipitation events. Diversion ditches direct undisturbed runoff away from the facilities while ponds and filters ensure that sediment generated from disturbed areas is contained within the preparation plant area. The net total suspended sediments leaving the property during existence of the preparation plant may in fact be less than pristine condition.

No water used in the coal preparation process will be discharged from the property. The coal cleaning process operates as a semi-closed system where water is pumped to the slurry ponds (refuse ponds) for clarification then back to the plant for reuse. Water losses are incurred from evaporation and infiltration. Water is recharged to the system from the alluvial well installed along the Price River. U. S. Steel owns and controls more than sufficient water rights for water supply.

Reclamation

U. S. Steel has submitted plans for reclaiming all hydrologic structures. The reclamation plans describe how U. S. Steel will restore the disturbed areas. Removal of the structures will be controlled so that no contamination of surface or ground waters occur.

Impacts

There is the possibility of impacts to the ground water system where water infiltrating from refuse and sedimentation ponds could contaminate other water sources or aquifers. The possibility of this situation has been evaluated by the applicant and mitigating measures have been submitted.

Since the transmissivities of the Bluegate Shale are low and no water users are noted for the Ferron Sandstone, it is anticipated that no adverse impacts will occur in these units. The regulatory authority agrees with these findings.

To provide against ground water contamination within the alluvium, the applicant has submitted analyses of refuse material typical of that which is discarded from the plant. These analyses show no excessive toxic- or acid-forming constituents present.

The applicant has installed monitoring wells at strategic locations within and adjacent to the preparation plant to monitor water fluctuations and quality so that diminution, if any, could be detected. Surface water monitoring is also performed on the Price River above and below the plant site to detect any changes in water quality or flow caused from plant activities.

Information supplied by the applicant shows that the existence of the coal preparation plant would not effect other water users by consuming water resources and contaminating downstream sources. The applicant estimates that approximately four cubic feet per second (cfs) per year is needed to maintain operations. The applicant owns 10.08 cfs of water diversion rights in the Price River for industrial use and leases 10 cfs of sewer plant outfall from the Price Water Improvement District. These amounts are more than sufficient for operation of the plant.

To ensure against contamination of downstream sources, the applicant will continue sediment control measures and operate a ground and surface monitoring program to detect any adverse changes in water quality during mining and postmining reclamation activities.

Because the slurry pipes cross the Price River, the potential exists that the slurryline could rupture or break and contaminate the river. Although the chance of this incident happening is slight, the applicant will inspect the slurry system on a regular basis to prevent such an incident.

All sediment control structures will be inspected on a regular basis to ensure the integrity of the design: precipitation event (plus sediment) that the approved plans were designed for.

Conclusion

Based upon the information and data presented in the permit application concerning the previous description of the existing environment, the plan for mine development, the monitoring plans and protective measures to be implemented, it is the Division's opinion that the cumulative hydrologic impacts from this proposed operation should not present significant short- or long-term changes to the existing hydrologic regime.

REFERENCES CITED

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