December 5, 1972

State of Washington
Department of Ecology

Mr. Lylse Parsons, Agri. Lease Supervisor
Department of Natural Resources
Olympia, Washington 98504

Dear Lylse:

Here is my summary report and recommendations for developing a ground-water supply to replace the pumping plant from the Okanogan River near Monse, Washington. The geologic cross section is not complete but will send it to you tomorrow. If you have any questions about my report, I will be glad to discuss them with you.

If you go ahead with the program as suggested, I would like to be informed on progress and results. If I can be of further service in this matter, please feel free to contact me.

Sincerely,

Office of Technical Services

Bob

Robert H. Russell, Geologist
Technical Assistance Division

RHR/jms

enclosure

cc: Howard Isacson
Don Huston
Hugh Crawford
Paul Eddy

GEOHYDROLOGIC RECONNAISSANCE: MONSE AREA

OKANOGAN COUNTY, WASHINGTON

By Robert H. Russell RHR

December 4, 1972

November 28, 1972, the writer, accompanied by Paul Eddy, Geologist, DOE and Howard Issacson, Olympia office; Don Huston, Brewster Office and Hugh Crawford, Ephrata office, all of DNR, made a reconnaissance of State owned land lying on the flood plain of the Okanogan River just north and west of the Town of Monse in Sec. 34, Twp. 31 N, Rge. 25 E.W.M.

The trip was made at the request of Mr. Lylse Parsons, Agriculture Lease Supervisor, DNR, for the purpose of evaluating the possibility of obtaining up to 2,300 gpm of water from wells to replace an existing plant pumping from the Okanogan River which has developed a serious problem, due to silt and debris deposited in the area of the intake during the 1972 flood on the Okanogan River. Water will be required to serve recently planted fruit trees by April 1, 1973, as well as other irrigated crops to be planted during the 1973 and 1974 season by individuals leasing the State owned land.

Geology:

The southern part of the Okanogan River Valley in the area of the Town of Monse, is underlaid by a thick series, up to 400 feet or more in places, of glacial and glaciofluvial sediments deposited in conjunction with the advance and ablation of the Okanogan lobe of the Frazier glaciation. The deposits in the area of interest consist principally of clay, silt, and fine sand with lessor amounts of sand, gravel, and till (hardpan). Sand and gravel beds occur principally in the upper 50 feet and

are usually capable of yielding moderate to large amounts of ground water to properly designed and constructed wells. In some places where only fine silts and clays are encountered, yields to wells are very low, which may require limited test drilling before production well sites are selected.

Glaciofluvial deposits below the 50-foot depth, although they are predominantly clays and silts, do contain beds of coarse sand and gravel which are capable of yielding moderate to large yields to properly designed drilled wells. The possibility of obtaining an aquifer or aquifers in the deeper glaciofluvial deposits would continue until the underlying bedrock is encountered at about 250-500 feet below land surface.

The underlying, granitic, and metamorphic bedrock is dense and hard with very low permeability and would not serve as a potential aquifer.

Hydrology:

Recharge to the lower Okanogan River Valley aquifer comes from precipitation falling directly on the local land surface or on the adjacent uplands which runs off to the river valley, and by infiltration from the Okanogan River when it is in flood stage. There is some artificial recharge from return flow from irrigated lands but it is insignificant since the Monse area to date is not highly developed to irrigated crops.

Ground water discharge from the lower Okanogan River Valley is to the Okanogan River via subsurface seepage and by evapotranspiration from plants and trees in the areas. Subsurface discharge and recharge from and to the ground water reservoir along the river changes with river stages.

A preliminary evaluation of the yield potential of the lower Okanogan River Valley aquifer was made by the U.S. Geological Survey as a part of the Department's Cooperative Program and it was concluded that a properly constructed well on the lower Okanogan River flood plain should have a yield in excess of 500 gpm. A review of results of existing wells for which data are available confirms that figure.

SUMMARY AND CONCLUSIONS

From observations made during the recent reconnaissance, together with personal knowledge that I have acquired during 20 years of experience in water resource matters, and a review of published and open file data, it is apparent that both surface water from the Okanogan River and ground water from the unconsolidated materials which underlie the river flood plain are available in the quantities required for the DNR irrigation project, north and west of the Town of Monse. In both cases, however, there are real or potential problems that must be resolved if the systems are to perform efficiently and effectively. A responsible development program should consider the following:

Recommendations.

1. Surface Water:

There is ample water available from the Okanogan River at the present pumping site if silt and trash problems at the intake can be resolved within acceptable cost limits. This will require a two-pumping plant system and moderate size reservoir where silt and other debris can be removed. This program should be reviewed by a competent design engineer.

2. Ground Water:

In my judgment, adequate ground water can be developed from properly designed wells to satisfy DNR's present need, 2,300 gpm. The following procedure is recommended:

a. Drill three (3) test wells on 100-foot centers along the existing right of way for the pipeline from the river diversion located in the NE 1/4 of Sec. 34, Twp. 31 N, Rge. 25 E.W.M. The first test well should be near the site of the present pumping plant and at least 50 feet west of the west scarp of the Okanogan River. Each test well should be designed to test the aquifer potential to a depth of 100 feet below land surface.

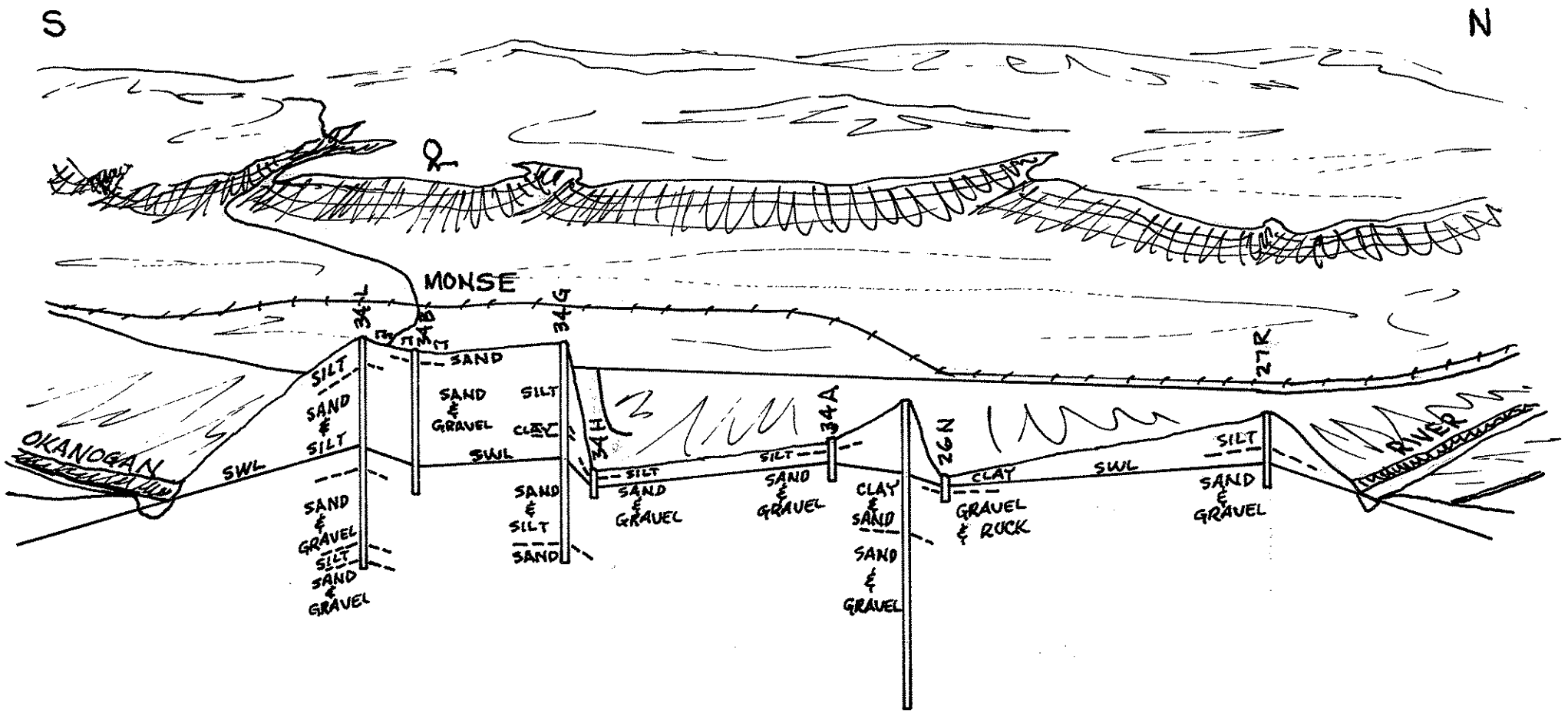
b. An accurate and complete log of the rock materials encountered during the drilling of each test well should be recorded as well as all water levels and water level changes if such do occur. Pump tests of each important aquifer should be performed during the drilling period and from the results of the composite pump test a safe yield capacity for a finished well computed.

c. If the pump test of the test wells are favorable and warrant the construction of a production well, a contract should be let for a large diameter (48")-dug (clamshell) well with specifications designed on the basis of the test well data. The production well should be finished with a twelve-inch (12") perforated or screened casing placed in the center of the 48" well base and the annular space between the 12" and 48" casings backfilled with graded gravel, size based on drillers log. The size and location of well screen or casing perforations will be dictated by results of the drillers log of the test well.

d. The same procedure used at well site No. 1 should be followed for sites two (2) and three (3) until sufficient capacity is obtained to satisfy the project's irrigation water requirement. If an adequate yield is obtained from well No. 1 or wells No. 1 and 2, it would not be necessary to construct well No. 3 unless it is desirable for standby purposes. The distance between wells should be 100 feet unless results of the pump test of well No. 1 suggests the distance should be greater to minimize well interference.

e. Prior to starting test well No. 3, some thought should be given to extending No. 3 to a greater depth (400 ±) to obtain geologic, hydrologic and yield potential data of deeper aquifers in the glaciofluvial deposits. This procedure would provide good information about a source of ground water that may be required for further development of the area and, at the same time, take advantage of the cost of the 1st 100 feet of drilling committed for test No. 3.

A gealogic cross section of the project area based on available drillers logs is attached.



GENERALIZED CROSS-SECTION

MONSE AREA, OKANOGAN COUNTY