Supplemental Site Specific Resource Information
PolyMet Mining Corporation
NorthMet 1999 Exploration Project

99P061

Prepared for
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August 1999

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3 Cultural Resources

3.1 Introduction

This section presents the results of a Phase I archaeological survey conducted by personnel from Foth & Van Dyke between July 26 and July 29, 1999. The Phase I survey was conducted prior to mineral exploration by PolyMet Mining Corporation (PolyMet). A grid was superimposed over the project area and shovel tests were excavated along grid-north transects. Approximately eight hectares (20 acres) of land was surveyed within PolyMet's leased area. No previously recorded historic properties are located within the project area and no new historic properties were located during this Phase I investigation.

3.2 A Regional Cultural History

Archaeological studies throughout Minnesota have expanded our knowledge concerning prehistoric cultures and refined our understanding of the regional characteristics of Minnesota's prehistoric populations. These regional characteristics were previously based on a general developmental sequence that broadly enveloped the eastern half of North America. In northeastern Minnesota, deglaciated landscapes within the Superior drainage system and the St. Louis River watershed provided landscapes for potential human occupation.

3.2.1 Paleoindian Tradition (12,000-7,000 B.P.)

Glacial ice in northern Minnesota began to retreat at approximately 13,000 B.P. and reached the Canadian border by 12,000 B.P. At that time, small nomadic bands of hunter-gatherers moved into the area. The people were specialized in hunting big game animals such as mammoth, caribou and bison. Little evidence of their occupation remains on the landscape due to their small band size and mobility patterns. Paleoindian sites in Minnesota are most frequently identified by isolated surface finds of fluted or lanceolate projectile points. The earlier fluted points belong to the Early Paleoindian period (12,000 - 10,000 B.P.) while the lanceolate or Plano projectile points date to the Late Paleoindian period (10,000 - 7,000 B.P.). Several Paleoindian sites have been located in Minnesota that have helped to define the Paleoindian tradition. In general however, the Early Paleoindian period is poorly known in Minnesota and most of the Paleoindian sites belong the Late Paleoindian period. Within northeastern Minnesota, the Late Paleoindian tradition is better represented than the Early Paleoindian tradition. Evidence for the Early Paleoindian tradition comes from a site in the Superior National Forest, the Bearskin site. A radiometric date from a fire hearth provided a date of 6300 B.P. (Harrison et al. 1995).

Deglaciated landscapes may have occurred earlier in parts of the St. Louis watershed than in the highland area along the western Superior basin (Phillips and Hill 1995; Hill 1995). However, site visibility has been affected by historic alterations of the St. Louis River's major tributaries. Several recently man-made reservoir lakes were created, which inundated portions of river valleys where sites could be located. Simultaneously, artifact and site visibility increased in

other areas when waters levels were reduced as the result of newly created reservoirs. Unfortunately stratigraphic context is usually lost with widely fluctuating water levels. Additionally, other historic activities such as logging and mining have reduced site visibility.

3.2.2 Archaic Period (7,000 B.P. - 200 B.C.)

As the environment began to change early in this period, prehistoric populations adapted to the alterations. The weather became warmer and drier and the expanding oak-hardwood forests and prairie began to dominate Minnesota. The local populations began to exploit different environmental zones which eventually developed into regional cultural variations (Lake Forest Archaic, Shield Archaic, and Prairie Archaic). The populations were still semi-nomadic, moving their small camps to exploit seasonal resources. Their hunting and gathering practices began to change with the disappearance of the big game animals from the region, but hunting continued to be a major source of food. Fish became an important resource at this time, as did nuts and berries, judging from the presence of roasting pits in their camps. Different technologies were being developed as well, such as the use of copper for tools, and the method of grinding and pecking stone to make tools. Chipped stone tools changed as well. Projectile points generally became smaller, and were notched or stemmed near the base. Additional chipped stone tools were added to the tool kit, such as scrapers, drills, knives, and punches, reflecting the increased exploitation of diverse local environments.

While excavating sites dating to the Archaic Period are somewhat scarce, some have revealed data relating to the increased use of local resources. Several sites typify the Archaic period in Minnesota and have greatly helped in our understanding of the subsistence and cultural behavior of Archaic peoples. These sites are the Itasca Bison Kill Site (21-CE-1) (Shay 1971), Petaga Point (21-ML-11) (Bleed 1969), the Patrow Site (Neumann and Johnson 1979), and Site 21-BL-40 (Lothson 1986). These sites all indicate repeated seasonal utilization of the area and a reliance on local raw material. Some sites within the Superior National Forest may represent a transition period between the Late Paleoindian and Early Archaic period on the presence of two artifact classes at the sites (Harrison et al. 1995) or may represent disturbed multicomponent sites.

3.2.3 Woodland Period (200 - B.C. - 1,700 A.D.)

The Woodland Period is the best known period in Minnesota. The appearance of pottery and burial mounds are commonly used to define the Woodland Period. While these two inventions serve to illustrate the increasing cultural complexity of prehistoric populations, the basic economic and subsistence patterns as well as their tool kit remained relatively unchanged. The appearance of ceramics in Minnesota predates the emergence of a permanent settlement pattern and intensive food production activities (Dobbs 1989, Benchley et al. 1997). The people still depended largely on hunting large and small game animals, collecting seasonal foods, and utilizing avian and aquatic resources.

In many areas of Minnesota, it is at this time that a reliance on wild rice as a primary food source becomes recognizable in the archaeological record. Trade also underwent an expansion during this time period, but mainly in the southern portion of the state. Sites in this southern area reveal material goods which would indicate increased contact with Hopewellian cultures located in Wisconsin, Illinois and Iowa.

Regional traditions become distinct during the Woodland period. This regional variation is due to environmental adaptation processes in specific ecological zones throughout the state such as the Prairie region to the west, the Headwaters Lakes region of the north, and the Mixed Forests region of central and eastern Minnesota. This variation also becomes apparent in pottery styles. One general characteristic of the western Fox Lake pottery is the sharply incised lines around the outside rim of the pot forming horizontal bands, diagonals, and cross hatching. The northern Laurel pottery differs in that it is decorated with a dentate stamp and is smooth, hard, and thin-walled. The east central wares of Malmo/Kern generally have repeated designs, such as reed or fingernail impressions, around the upper portion of the vessel (Johnson 1988).

3.2.4 Late Prehistoric (900 A.D. - 1700 A.D.)

The Late Prehistoric Period is characterized by the Sandy Lake ceramic series. The Sandy Lake ceramic series is found in central and northern Minnesota, Ontario and Manitoba, and first appears approximately 1000 A.D. These ceramics have little in the way of decorative treatment. Shell-tempering is utilized in the manufacturing process in the southern reaches of Sandy Lake, although grit-tempering is found in Sandy Lake ceramics in Ontario (Anfinson 1979: 175). Shell-tempering in these southern areas may indicate an influence from the Oneota tradition located to the south. Exterior surface treatments include plain surfaces, vertical and smoothed-over cordmarking, as well as simple and checked-stamping (Anfinson 1979: 176). Sandy Lake ceramics are often found on or near lakeshores, which may be due to an intensive use of wild rice. Sandy Lake ceramics may be associated with Dakota tribal units in the area during the Early Historic period, as many Sandy Lake sites are found at locations known to be inhabited during the Early Historic period by Dakota groups.

3.2.5 Historic Period (Contact to Present)

Undoubtedly, the northern regions felt the presence of eastern colonization by Europeans and Euroamericans long before the first explorer pressed his way into the area. In the early 1600's Ojibwe groups, armed with firearms and actively involved with the fur trade, pushed their way into the region, displacing the Siouan groups that had occupied the region earlier. These groups fought for the area almost to the turn of the 20th century. Fur trading posts became established in northern Minnesota in the latter half of the 18th century. Less than 75 years later fur trading in this area had all but vanished due to over trapping and the decline of beaver fur as a fashionable item in Europe. Logging in southern Minnesota around 1830 and in northern Minnesota by 1850. The logging boom of the late 1800's and the building of the railroads around this time opened the way for homesteaders at the turn of the century. Today, logging, mining, and tourism are the most important industries in northern Minnesota.

3.3 Methods

3.3.1 Pre-Field Research

Prior to beginning the fieldwork an Archaeological Resource Protection Act (ARPA) Permit was obtained from the Superior National Forest Historian (Appendix B).

Several sources of information available at the Forest Service office in Duluth and the State Historic Preservation Office site files were consulted. This research provided information regarding archaeological and historical resources in the vicinity of the proposed project area and identified previously recorded historic properties. This background information was necessary to understand the range of sites that could potentially be encountered during the archaeological survey.

The pre-field research resulted in identifying four previously recorded sites within a one- to two-mile radius of the project area (Drawing A). These sites are historic and include logging camps and sawmills. The four sites include: Knot Camp (SNFIN 01-314), Stubble Creek Mill (SNFIN 01-364); Far West Dunka Camp (SNFIN 05-646), and Lectionary Camp (SNFIN 01-313). No previously recorded archaeological sites are recorded in the project area.

3.3.2 Field Methods

The archaeological survey conducted by Foth & Van Dyke was directed toward identifying previously unknown archaeological sites within the proposed project area. The procedure employed to achieve this objective was a combination of pedestrian survey and shovel testing along drilling transects.

3.3.3 Pedestrian Survey

Pedestrian survey is the visual inspection of the ground surface. The ground surface often possesses thick second-growth vegetation or large amounts of leaf accumulation. Therefore, pedestrian survey lends itself to identifying obvious surface artifacts and features associated with Euroamerican settlement and industrial or commercial activities, such as logging. If there are patches of exposed soil, they are inspected for prehistoric and historic cultural material.

3.3.4 Shovel Testing

Shovel testing was aimed at locating sites that lack surface features and was employed when surface visibility was less than 30 percent. The shovel tests were approximately 40 cm in diameter and were excavated approximately 20-30 cm below the base of the A or E soil horizons when possible. The soil was screened through 1/4-inch hardware cloth and examined for cultural material. Each shovel test soil profile was recorded noting soil horizons, textures, inclusions and colors as determined by a Munsell Chart. After screening the soil and recording the test pit

profile, the soil was returned to the test pit. Shovel tests were separated by 15 m on each drill hole transect.

3.4 Results

Pedestrian survey and shovel testing at a 15 m interval was conducted in the Area of Potential Effect where possible. A total of 166 shovel tests were excavated and each test pit was recorded. All of the shovel tests were negative. Table 1 describes the length of each transect surveyed, the number of shovel tests per transect, and the reason for fewer than expected shovel tests along transects or particular lengths.

Table 1
Shovel Testing Results

Transect	Length (m)	Number of Shovel Tests	Comments
200E	244	10	Wetland
188E	152	2	Wetland
180E	274	2	Wetland
172W	213	6	Wetland
170E	274	18	Outcrop/Wetland
168E	305	16	Wetland
166E	305	17	Wetland
164E	152	11	Wetland
162E	305	20	Wetland
160E	305	18	Wetland
154E	366	24	Outcrop/Wetland
152E	366	19	Wetland
150E	244	0	Beaver Pond
148E	152	0	Beaver Pond
146E	396	0	Beaver Pond
144E	610	0	Beaver Pond/Outcrops/Clear Cut Land
134E	610	3	Beaver Pond/Outcrops/Clear Cut Land
131E	457	0	Wetland/Clear Cut Land
128E	457	0	Wetland/Clear Cut Land

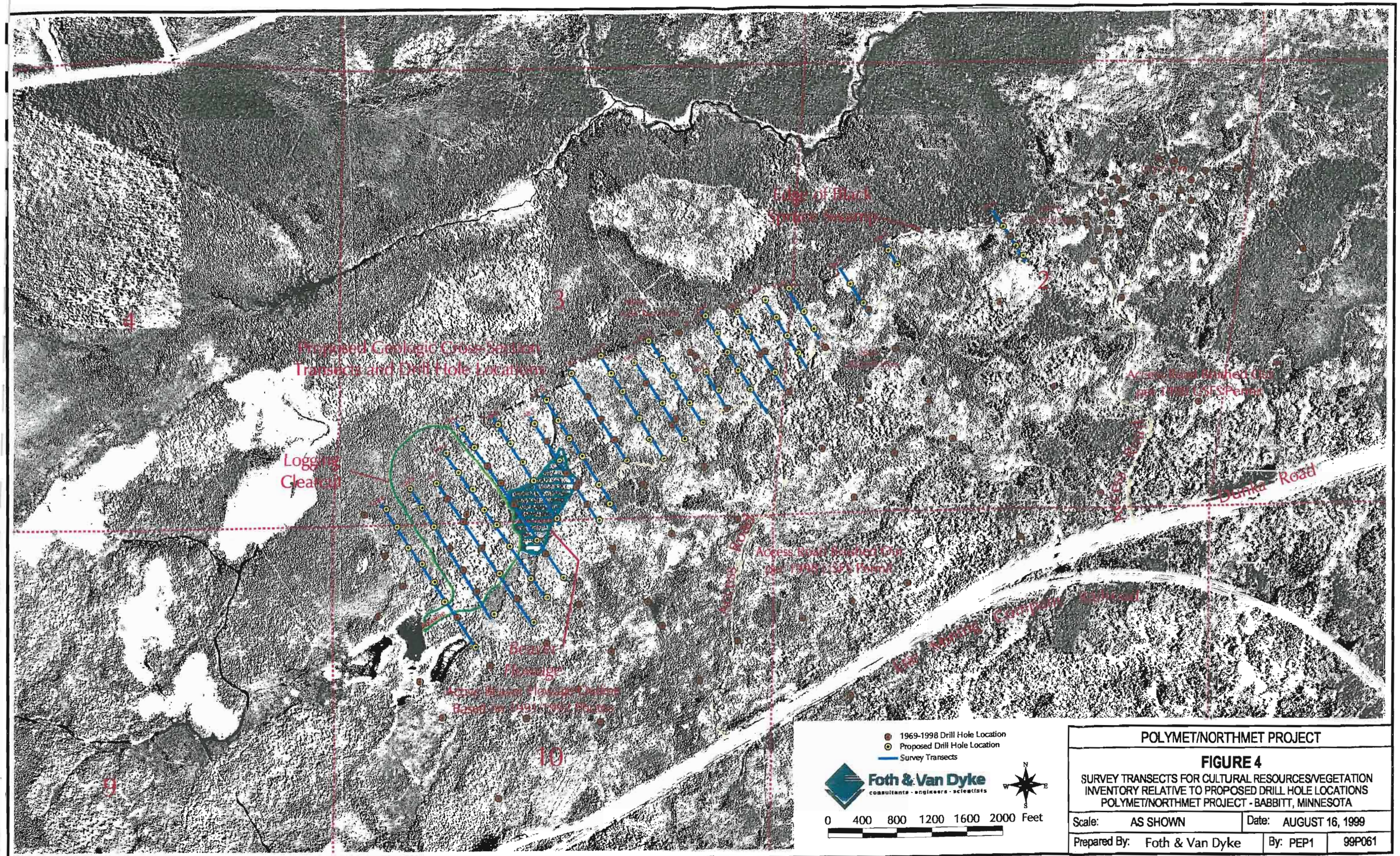
Transect	Length (m)	Number of Shovel Tests	Comments
124E	518	0	Wetland/Clear Cut Land

Transects 152E through 200E were the focus of the archaeological survey. Some transects were not shovel tested due the presence of standing water (black spruce bog, tag alder swamp, beaver ponds), the absence of topsoil (A horizon) in very recently clear cut areas, and little to no soil development on bedrock outcrops. Transects 146E, 148E and 150E are located within a large beaver pond. Transects 134E and 144E are located west of the beaver pond and pass through a wetland below the beaver dam, a bedrock outcrop west of the beaver pond, and a clear cut area north of the pond. Transects 136E, 128E and 131E pass through a wetland and an area of clear cut. The remainder of the transects were shovel tested at a 15 m interval. Shovel testing was conducted from south to north along the transects until the large black spruce bog, known as One Hundred Mile Swamp, was reached. Two shovel tests were skipped on Transect 154E prior to reaching One Hundred Mile Swamp due to bedrock at the ground surface. One shovel test on Transect 170E was skipped due to bedrock at the ground surface.

No archaeological sites were discovered during this Phase I survey. Therefore, it was not necessary to make site maps and complete archaeological site forms.

3.5 Recommendation

No archaeological sites were found within the Area of Potential Effect and therefore no additional archaeological work is recommended.



1969-1998 Drill Hole Location
Proposed Drill Hole Location
Survey Transects

Foth & Van Dyke
consultants - engineers - scientists

N
W E
S

0 400 800 1200 1600 2000 Feet

POLYMET/NORTHMET PROJECT

FIGURE 4

SURVEY TRANSECTS FOR CULTURAL RESOURCES/VEGETATION INVENTORY RELATIVE TO PROPOSED DRILL HOLE LOCATIONS POLYMET/NORTHMET PROJECT - BABBITT, MINNESOTA

Scale:	AS SHOWN	Date:	AUGUST 16, 1999
Prepared By:	Foth & Van Dyke	By: PEP1	99P061