

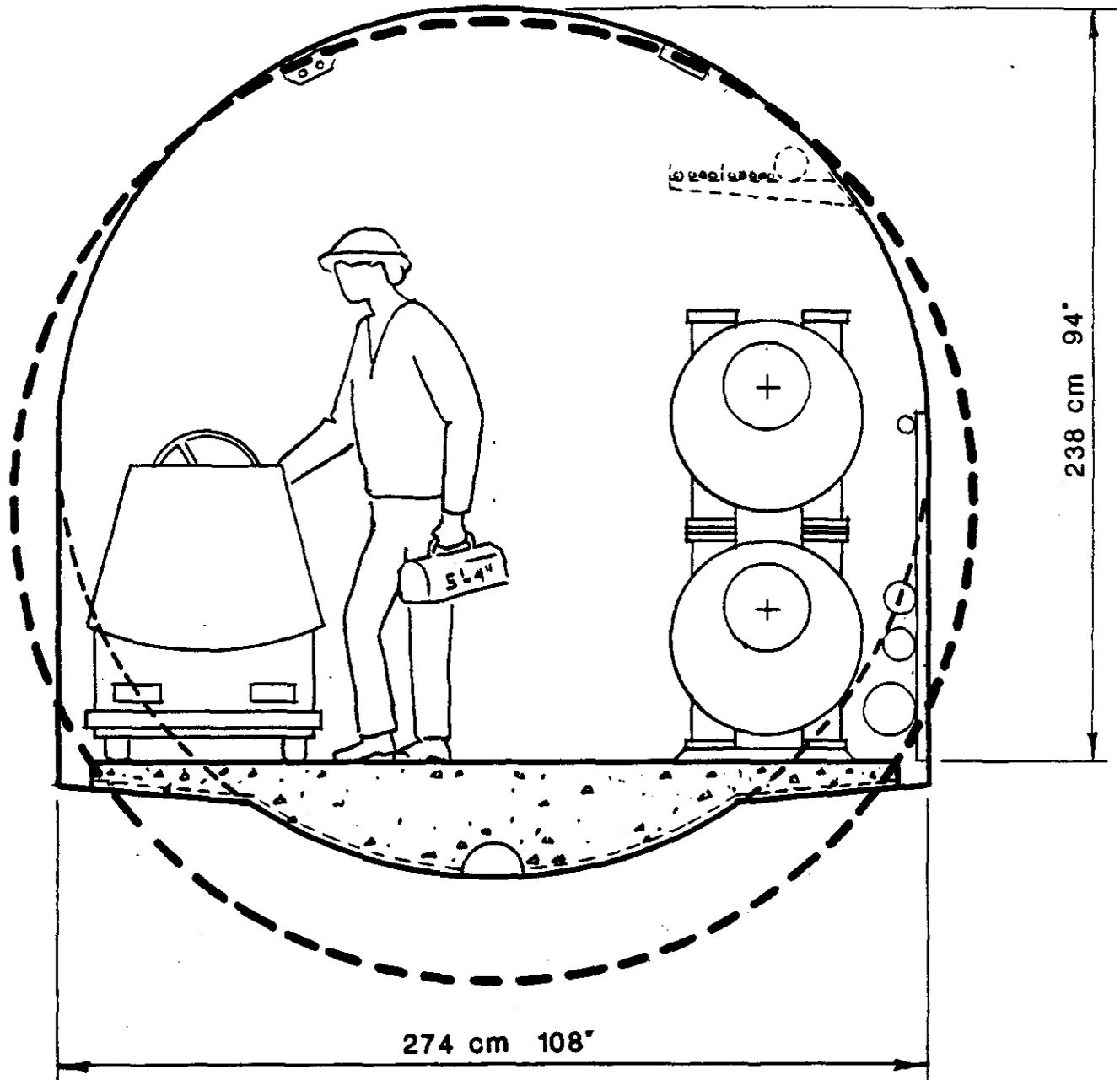
OPTIONAL TUNNEL CROSS-SECTION IN ROCK

Based on the NAS report to the DOE on the Best Qualified List of Sites for the SSC, almost all of the tunnels are in good rock requiring minimal support. None seem to require a major lining for support. The relevant data are summarized in Table I. This opens the possibility of an optional reduced-volume tunnel which maintains the same cross-section as in the CDR. This is illustrated in Figure 1.

By cutting the corners out of a 9-foot diameter tunnel, the canonical invert width and crown height are retained as in the CDR. The straight wall on either side can be advantageous for installation and operations. Some TBM's on the market have the capability of side cuts by incorporation of road headers into the body of the machine. The savings in excavation of cross-section amounts to 1.0 m^2 , as noted, while the reduction in invert volume is 0.72 m^2 . Using standard rules-of-thumb, cost savings of \$30 M in excavation and \$5 M in concrete would be indicated.

TABLE I.
BQL TUNNEL & IR CHARACTERISTICS

Site	IR's	Tunnel	Av (ft) Depth	Geology	Lined	Water	Comments
AZ	surface?	cut & fill tunnel	--	1) fanglomerate (lightly cemented sedimentary rock) 2) granitic rocks 3) interbedded volcanic & sedimentary	?	no	1) mixed face tunneling 2) possible faults & shear zones 3) some deep shafts
CO	surface?	tunnel	~100'	uniform Pierre shale	shotcrete plus ?		immediate sealing of shale against slaking
IL	caverns	tunnel	~300'	uniform dolomite	no	at shafts	caverns w/ minimal roof supports & shotcrete
MI	surface?	tunnel	?	shales, limestone, dolomite	long unlined sections	shafts, slurry walls required	
NC	caverns	tunnel	175'	interlayered, meta- morphosed volcanic & sedimentary rocks	little need for supports	modest water inflow	major shear zone; local pt. instabilities
TN	caverns	tunnel	~400'	homogeneous ordo- vician limestone	minimal	at shafts	
TX	surface?	tunnel	~200'	chalk and marl	minimal	?	some IR's bottom in heaving shale



DIFFERENCE BETWEEN AREA OF CROSS SECTIONS:

TUNNEL - - - - - 1.00 m² (10.8 ft²)

CONCRETE FLOOR- 0.72 m² (7.75 ft²)

FIGURE 1