Unique Document # SAB200087890006

SANDIA REPORT

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SAND88—0360
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ASP RAP-200 Data and Trajectory Analysis

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW-DATE: 4-18-08
AUTHORITY: ☐ DC ☒ DD
NAME: Eric Holzer
2ND REVIEW-DATE: 4/18/08
AUTHORITY: [illegible]
NAME: [illegible]
DETERMINATION [CIRCLE NUMBER(S)]
1. CLASSIFICATION RETAINED
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
4. COORDINATE WITH:
5. CLASSIFICATION CANCELED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY): DOD BRACKETS (MCTL) [redacted]
PER LETTER DTD. 10/2/97

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Albuquerque, New Mexico 87185 and Livermore, California 94550
for the United States Department of Energy
under Contract DE-AC04-76DP00789

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ABSTRACT

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Nomenclature

a	Acceleration
B	Buoyancy (138 lbf for ASP)
C_D	Drag coefficient $= D/(qS)$
C_ℓ	Roll moment coefficient $= \ell/qSd$
C_{ℓ_p}	Roll damping coefficient $= \partial C_\ell/\partial\frac{pd}{2V}$
$C_1 \ldots C_7$	Coefficients of fit for gyro data - Eqs. 8 – 10
d	Base diameter = 14.7 inches
D	Drag force
g	Acceleration due to gravity
h	Depth
ℓ	Rolling moment
m	Vehicle mass = 789 lbm
p	Roll rate
p_c	Cavity pressure
p_{hs}	Hydrostatic pressure, in psf - Eq. 7
q	Free stream dynamic pressure $= \rho V^2/2$
S	Reference area = 1.179 ft^2
t	Time from water impact
V	Velocity
x	Horizontal distance
z	Vertical distance
γ	Flight path angle, measured from horizontal
θ	Pitch angle for fit - Eq. 9
ρ	Salt water density = 1.989 slug/ft^3
σ	Cavitation number $= (p_{hs} - p_c)/q$
ϕ	Roll angle for fit - Eq. 8
Φ	Roll angle from zero reference point - Eq. 11
ψ	Yaw angle for fit - Eq. 10

ASP RAP-200 Data and Trajectory Analysis

1 Introduction

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9 Recommendations

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