

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0131 779324

(Note: As practicable as possible the JIT report is to be signed in the field by all the participating parties)

A. GENERAL INFORMATION:

1. Spill incident Number: 779324 2. Type of incident* OIL SPILL
 3. Name of Location 28" NKPOKU - BOMU PIPELINE
 4. Name of nearest community ALETO - NCHIA - ELEME 5. State: RIVERS 6. LGA ELEME
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District NPE / PH 1

B. INCIDENT INFORMATION:

9. Details of incident
 a. Date of incident: 20TH FEBRUARY, 2012.
 b. Date/Period of investigation: 26TH FEBRUARY, 2012, 16TH MARCH, 2012.

c. Description of spill point environment

- | | | |
|---|--|---|
| <input type="checkbox"/> Firmed soil | <input checked="" type="checkbox"/> Loose soil | <input checked="" type="checkbox"/> Previously excavated area |
| <input type="checkbox"/> Under water | <input type="checkbox"/> Swampy | <input type="checkbox"/> Exposed pipe surface |
| <input type="checkbox"/> Well Platform (on Water) | | <input type="checkbox"/> Rig |

d. Description of leak point (tick as applicable);

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> Drilled hole | <input type="checkbox"/> Hack saw cut | <input type="checkbox"/> Explosive tear, |
| <input type="checkbox"/> Complete Rupture | <input type="checkbox"/> Inward dent, | <input type="checkbox"/> Well head tampering |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | | <input type="checkbox"/> Missing Pipeline/Flowline) |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point, | | <input type="checkbox"/> Third party tampering with Clamp |
| <input type="checkbox"/> Third party tampering with valve setting, | | <input type="checkbox"/> Third party tampering with flange, |
| <input type="checkbox"/> External Corrosion | | <input type="checkbox"/> Internal Corrosion |
| <input type="checkbox"/> Saver-pit over flow, | <input type="checkbox"/> Surge vessel overflow, | <input type="checkbox"/> Outward dent |
| <input type="checkbox"/> Flare System/Bund wall Failure | <input type="checkbox"/> Valve Failure | <input type="checkbox"/> com unit failure |
| <input type="checkbox"/> Cold vent | <input type="checkbox"/> Relief valve failure | <input type="checkbox"/> Others (specify) _____ |

e. Incident due to:

- Third party interference Operational Others (specify) _____

f. Spill point coordinates (MINNA MID-BELT)

Measuring unit (M)	
Northing: <u>89932.49</u>	Easting: <u>515517.08</u>

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire,

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C. RISK ASSESSMENT

10. Type of environment:

- Land Swamp Water Seasonal swamp

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Raining Sunny

11. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [,m]
 Drinking water source [,m]
 Built up area [,m]
 Farmlands [NIEL ,m] **FARMLAND SLIGHTLY IMPACTED.**
 Fish Farm/Pond [,m]
 Fishing net [,m]
 Others (specify). [,m]

12. Containment measures put in place;

- Booms Trench Dyke

Others: NATURAL DEPRESSION

13. Any pictures or video coverage? [Y] [N]

14. Was there any disruption to the investigation? [Y] [N]

If yes give brief description:

NOT APPLICABLE

D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL

15. Structures / Properties

S/N	Type of Structures	Description	Size	Number	Comments
<u>NONE WITHIN AREA OF IMPACT</u>					

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	CASSAVA STEMS		✓		FEW	FARMLAND VEGETATION SLIGHTLY IMPACTED.

17. Fish/Nets/Ponds

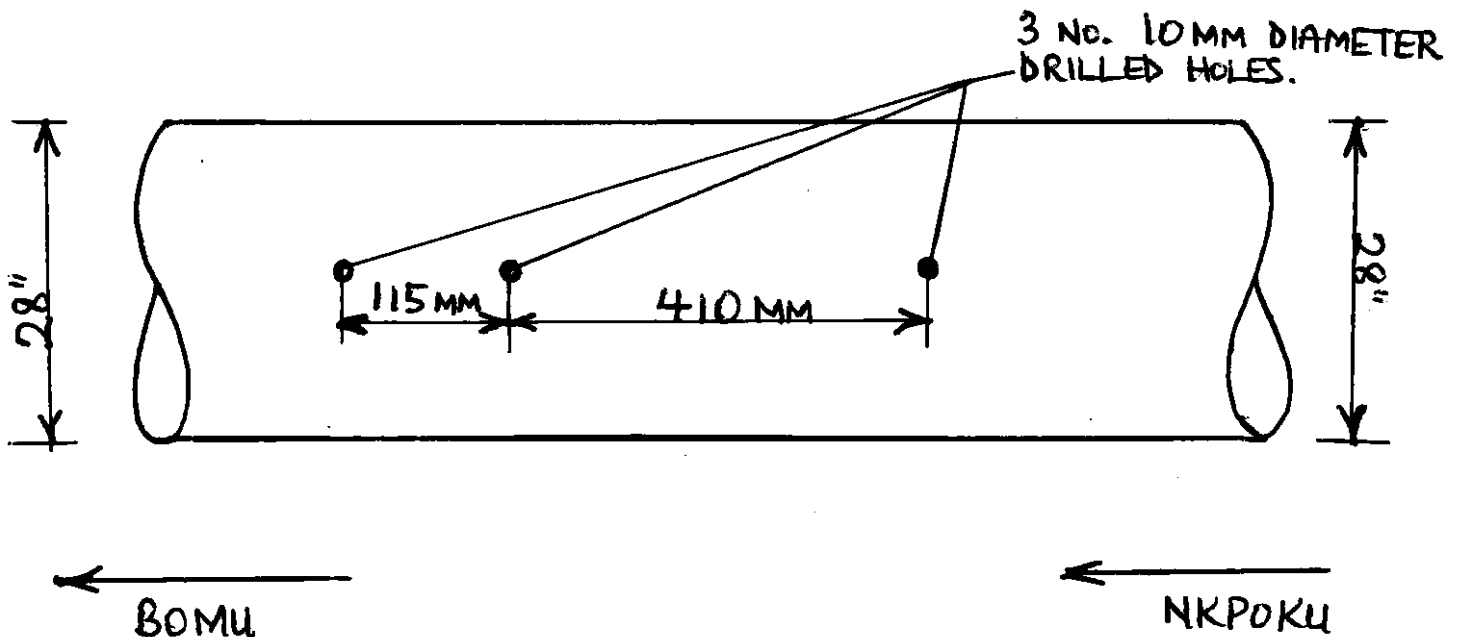
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
		NONE WITHIN AREA OF IMPACT		

18. Others (Specify) i.e. Animal Traps

S/N	Others	Description	Quantity/Size	Comments
		NONE WITHIN AREA OF IMPACT		

E. GRAPHIC DESCRIPTION OF LEAK POINT (Overview sketch of the site should be added as an appendix 1)

SECTION (SHOWING PLAN) OF 28" NKPOKU - BOMU PIPELINE AT ALETO-NCHA-ELEME SHOWING 3 NO. DRILLED HOLES AT 12 O' CLOCK POSITIONS.



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F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

19. Impacted area boundary Coordinates (If more than 12 points, Attach as an appendix 2) MINNA MID-BELT

S/N	Northing (m)	Easting (m)
WP491	89926.37	515504.75
WP492	89957.14	515480.16
WP493	89951.01	515477.06
WP494	89954.09	515470.91
WP495	89969.45	515470.94
WP496	89963.29	515477.09
WP497	89994.04	515461.74
WP498	90000.18	515467.92
WP499	89987.84	515489.46
WP500	89957.07	515514.05
WP501	89892.50	515544.74
WP502	89874.05	515553.94
WP503	89800.23	515603.10

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.41 Hg
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

21. Volume of oil recovered before completion of JIV (V_{rec}):

Recovered oil V_{rec}	<u>1770.4</u>	barrels
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20. Computation of the residual volume on site

a. Computation of volume of pool of free phase oil (on land or confined water body).

RECOVERY
OF FREE
PHASE OIL WAS
DONE ON A
DAILY BASIS
THROUGHOUT THE
PERIOD OF INVESTIGATION.

- Area (m^2) occupied by pool of free phase oil 508
- Average Depth (m) of pool of free phase oil 0.18
- Emulsification factor: NIL

iv. Volume of pool of free phase oil, V_{pool} :	<u>575.16</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: 3605
- ii. Area of the pool of free phase oil in touch with soil: NIL
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.09
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>163.26</u>	barrels
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21. Computation of volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: NIL
- ii. Table of average depth of oil on water based on coloration *

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004	NOT APPLICABLE	
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>NIL</u> bbl

iii. Volume of oil on open water. V_{wat}	<u>NIL</u>	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM
- ii. E-Factor: 25%

AVAILABLE SURFACE AREA FOR EVAPORATION IS 0.41 Ha.
AVAILABLE VOLUME (FREE PHASE OIL AND INFILTRATED OIL) FOR EVAPORATION IS 738.42 BARRELS

iii. Volume of evaporated oil. V_{evap}	<u>246.14</u>	barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Period Since Oil Spill	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

23. Gross Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls) = 246.14 + NIL + 163.26 + 575.16 + 1770.4 = 2,754.96$

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<u>V_{Est}(bbls)=</u>	2,755 BARRELS
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 246.14 + NIL + 163.26 + 575.16 + 1770.4 = 2,754.96$	
<u>V_{Est}(bbls)=</u>	2,755 BARRELS

*Calculation of the respective estimated volume is to be done using the new spill estimation software on site

*Conversion of m3 to barrels is Total volume VT (m3) x 6.29

*Emulsification factor for spill on water to consider is 60% of volume of oil.

25. GENERAL STATUS OF THE SITE

- A. Joint investigation of the incident site found that there is no residual impact After the initial response and therefore recommend that the site be closed out
- B. Investigation of the incident site showed that there is residual impact on site requiring further works

26 Signatories

This report was filled and signed on the 16/03/2012 at incident site by joint investigation representatives from

- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

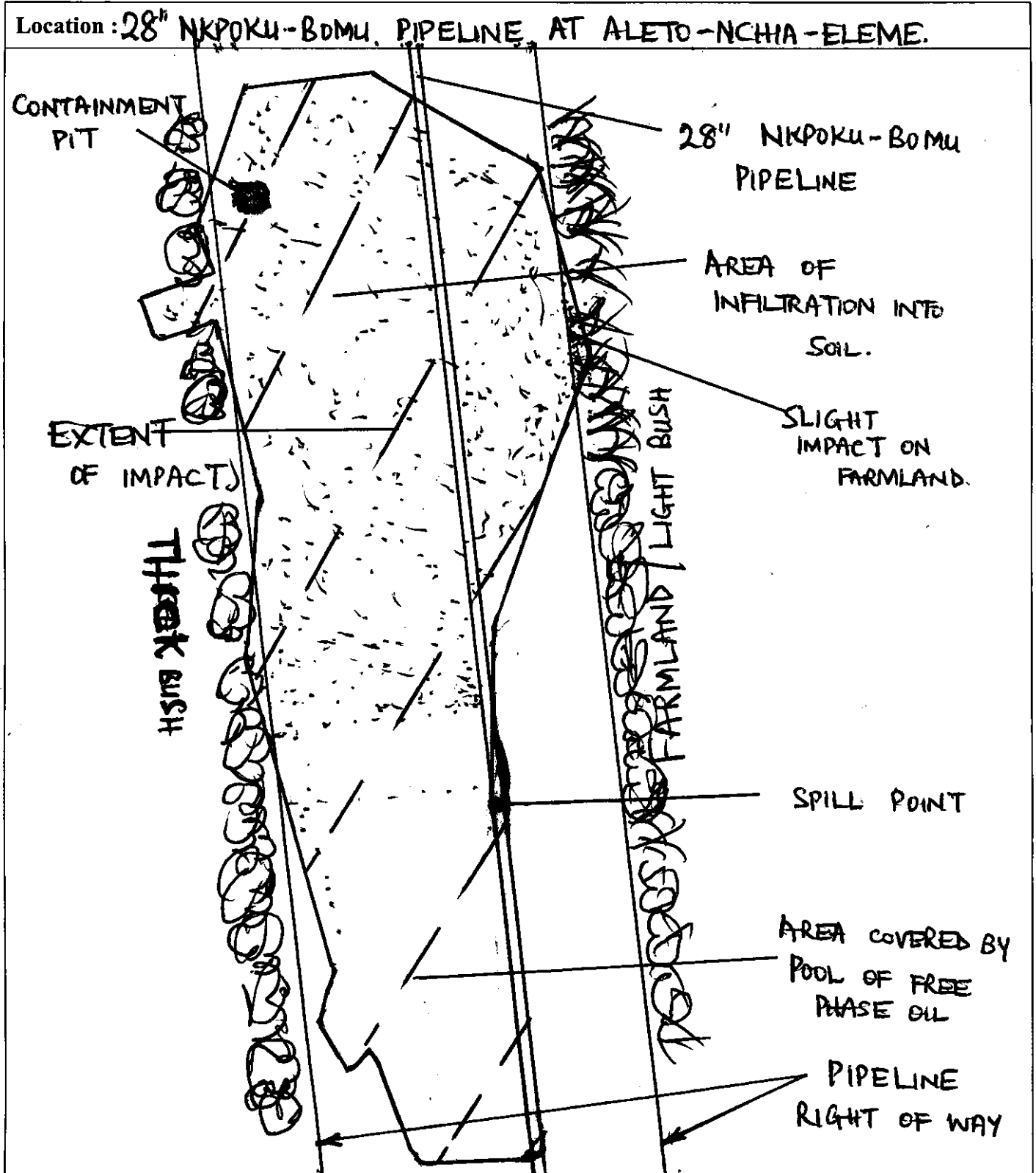
DPR INCIDENT INVESTIGATION REPORT ATTACHED.

Tick as applicable

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20. Appendix 1: Overview sketch of the site



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21. Appendix 2: TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION MINNA MID-BELT

S/N	Northing (m)	Easting (m)
WP504	89800.24	515596.93
WP505	89812.54	515587.71
WP506	89809.48	515584.63
WP507	89815.64	515578.47
WP508	89821.78	515578.49
WP509	89883.32	515529.31



DEPARTMENT OF PETROLEUM RESOURCES

FIELD JOINT INVESTIGATION REPORT

(Note: As practicable as possible the field report is to be signed in the field by all the participating parties)

- 1. Company..... SPDC
- 2. Incident Serial Number..... 779324
- 3. Name of Location/Facility..... 28" NKPOKU-RDMU PIPELINE AT ALETO, ELEME, KNERE STATE

4. Type of Incident: (Indicate ✓ where appropriate and X where not applicable)

- Crude Oil Spill
- Product Spill (Specify)
- Drilling Mud/Chemicals Spill
- Fire
- Others (specify)

5. Details of Incident

- i. Date of Incident: 20/02/2012
- ii. Date Reported to the DPR:
- iii. Date/Period of First Investigation: 26/02/2012
- iv. Date/Period of Second/Subsequent Investigation: 16/03/2012
- v. Cause of Incident (Indicate ✓ where appropriate and X where not applicable)

- Corrosion
- Equipment Failure
- Human Error (Production/Maintenance)
- Third Party Interference
- Mystery Spill
- Others (Specify)

Additional description of cause of incident (if any): Three (3) drilled holes 11.5 cm apart and 41 cm apart at 12 o'clock position was observed on the 28" pipeline. The spill occurred as a result of sabotage.

- 6. Coordinates of Spill Point/Location(s): Left Northing 89932.49 Easting 515517.08

7. Brief Description of Circumstances Around Spill Point(s) (Please indicate containment measures put in place, point of breach along pipeline and any necessary details observed at site. Attach additional sheets if necessary)

8. Delineation of Impacted Area: (Indicate ✓ where appropriate and X where not applicable)

- a) Within company's facilities/ROW
- b) Outside company's facilities/ROW

9. Description of Environment Around Spill Point/Location(s): (Indicate ✓ where appropriate and X where not applicable)

- Land
- Seasonal Swamp
- Swamp
- Coastland
- Inland waters
- Near shore
- Offshore

Please provide a graphic sketch of spill site/leak point (Detailed sketches and maps can be attached where necessary)

Table of Key Coordinates of Mapped Area

S/N	Eastings	Northings
1142	515504.75	89926.37
1143	515480.16	89957.14
1144	515477.06	89951.07
1145	515470.91	89954.09
1146	515477.09	89963.29
1147	515470.94	89969.45
1148	515461.74	89994.04
1149	515467.92	89900.18
1150	515489.44	89987.64
1151	515544.74	89957.07

S/N	Eastings	Northings
1152	89892.50	51553.94
1153	89874.05	515603.10
1154	89800.23	515506.93
1155	89800.24	515587.71
1156	89812.34	515524.63
1157	89809.48	515578.47
1158	89815.64	515578.49
1159	89821.78	515529.31
1160	89883.32	515574.03

10. Property Impacted (Provide details)

11. Communities Impacted

a)

b)

c)
d) ^{e)} 2,755 Bbls
12. Estimated Quantity Spilled (bbls):
(Please provide below, the methodology used, standards adopted and any assumptions made in the estimate. Where relevant, make brief comments on quantities unaccounted for. Attach and endorse additional sheets if necessary)

13. Quantity Recovered (As at time of the investigation): 1,762 Bbls

14. Any Photograph or Video Recording? (Provide details): Pictures and video recordings were taken during the spill.

15. Additional Comments/Remarks, if any:
Clean-up of the impacted area should be carried out immediately.
Curfew activities should also be stepped-up to prevent a re-occurrence.